THE MARINE REVIEW

VOL. 38. CLEVELAND, DECEMBER 17, 1908. NEW YORK No. 25

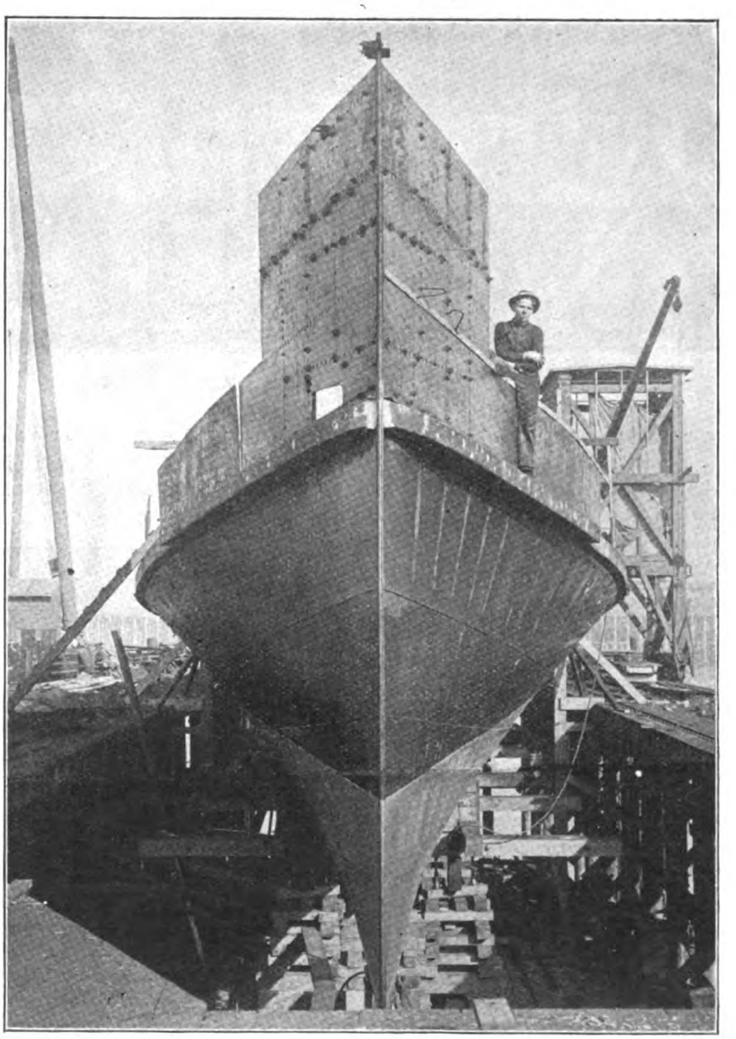
LAUNCH OF THE STEAMER H. B. KENNEDY.

The Willamette Iron & Steel Works, Portland, Ore., successfully launched the new steel passenger steamer H. B. Kennedy at 3 P. M. Saturday, Nov. 28. The launching was one of the most elaborate affairs of the kind ever held in Portland. The steamer was christened by Miss Minna Bennbennick, of Bremerton, Wash. In addition to the honor of christening the new steamer, Miss Bennbennick was presented with a life pass, beautifully engraved on silver plate, good on the steamers of the Port Orchard route. A number of people prominent in marine affairs on Puget Sound attended the launching. Among these were H. B. Kennedy, president of the Port Orchard route, and wife, and Capt. Wm. E. Mitchell, who will command the Kennedy. After the launching the guests of honor were banqueted by the builder at the Oregon hotel.

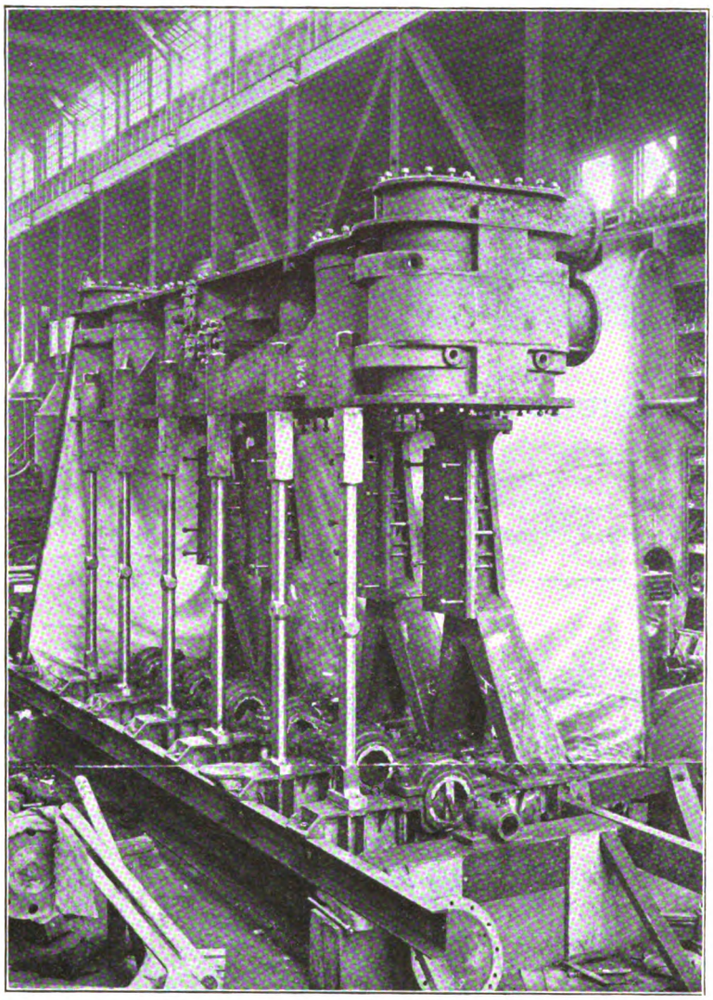
The H. B. Kennedy is a steel passenger steamer built for the Seattle-Bremerton run on Puget Sound. She is 190 ft. in length over all, 25 ft. water line beam, 13 ft. molded depth and will have a displacement of about 500 tons. Her hull, main deck and five arch frames supporting the cabins are of steel, while the cabins above the main deck are of wood. The social hall will be finished in mahogany, the ladies' cabin in quarter-sawed oak and the cafe in fir, mission style. This finish will make the Kennedy the finest daylight steamer on Puget Sound.

Her engine, illustrated in Fig. —, is designed to indicate 2,000 H. P. at 250 lbs. boiler pressure and 200 R. P. M. The engine is four-cylinder, triple-expansion, 18, 27, 34 and 34 in. in diameter by 24-in. stroke. It will run at 200 R. P. M., driving a 9 ft. 6 in. propeller with a pitch of 10 ft. 6 in. This is guaranteed to give a speed of 20 miles per hour. Allowing 20 per cent propeller slip the above dimensions figure out a speed of 24.4 miles per hour.

Two independent double-ended water tube boilers, each with 4,000 sq. ft. of



BOW VIEW OF THE H. B. KENNEDY BEFORE LAUNCHING.



TRIPLE EXPANSION ENGINE 2,000 H. P. FOR STEAMER H. B. KENNEDY.

heating surface, will generate the steam. These boilers will be fired from both ends and burn crude oil. The boilers and engine were designed and built by the Willamette Iron & Steel Works.

The boat was constructed on an even keel, considerably above the present level of the river on account of the fact that the keel was laid in July during the high water. She was lowered 25 ft. at the stern and 12 ft. at the bow just previous to launching. The operation of lowering the heavy steel hull was exceedingly interesting. The hull was carried in a cradle which in turn was supported by 36 20-ton jacks. On each of the five steel arch frames a target was fixed, the five targets being adjusted to perfect vertical alignment by a wye level set up on the bow. Then as the boat was lowered any irregularities in the movement of the jacks which resulted in ever so slight a springing of the hull could be instantly detected by the level. In this manner, the movement of the jacks being governed by a previously arranged whistle system, the boat was lowered without mishap or straining. Three days were consumed in lowering.

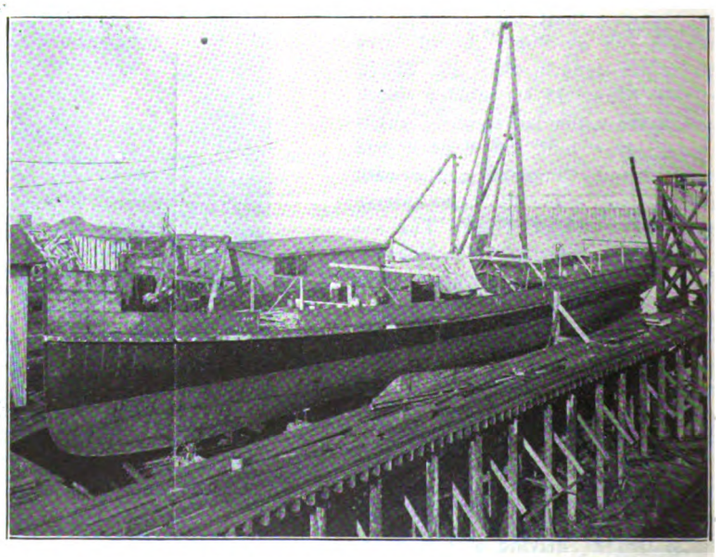
The H. B. Kennedy represents the maiden effort of the Willamette Iron & Steel Works in steel ship building and is a very creditably constructed boat. She was built under the direction of Wm. H. Corbett, president, and Bert C. Ball, treasurer and chief engineer.

PORT OF PORTLAND TO BUY NEW TUGS.

J. B. C. Lockwood, chief engineer of the port of Portland, a corporate body comprising certain territory in Multnomah county, Oregon, vested with taxing power and having charge of improving the Columbia river from Portland to the sea, in his report to the commission dated Dec. 3, recommends the construction of four steel tugs for towage service on the Columbia river.

The text of Mr. Lockwood's recommendations is as follows: "I recommend for the bar tugs that we secure two first class steel boats about 150 ft. long, 26 ft. beam and 16 ft. deep, equipped with Scotch marine boilers, triple expansion engines, towing machines, and all necessary auxiliaries and accessories; and one steel boat about 120 ft. long, 22½ ft. beam and 13 ft. deep, equipped with compound engines and otherwise similar to the large tugs.

"For the river, I recommend one steel hull, stern-wheel tug about 195 ft. long, 42 ft. beam and 9 ft. deep, equipped with cross compound engines, firebox boilers, surface con-



STEAMER H. B. KENNEDY PREVIOUS TO LOWERING TO LAUNCHING POSITION.

densers and all necessary auxiliaries.

"My investigations in regard to the purchase of vessels now in commission satisfy me that with the possible exception of the smaller propeller tug, it will be better policy to build new vessels rather than buy any of those which have so far been offered. In the first place, we cannot get boats which are exactly what we want. In the second place, such new boats as are offered will cost us more than to build new; and in the third place, the old boats will cost as much as new by the time they are put in first class shape, and even then will not be just what we want.

"While it is hoped that the service will be self-sustaining it has seemed that the first consideration is to provide a plant that will give prompt and satisfactory dispatch to vessels visiting the Columbia river.

"I estimate the cost of the equipment enumerated above at $350,000."

A NEW ROUTE FROM THE ANTIPODES TO PUGET SOUND.

Through the courtesy of the United States hydrographic office and Prof. Frederick E. Beckman, of the University of Washington, we are able to present the following synopsis of three unusual voyages of the French ship Admiral Cecille from Hobart, Tasmania, to Puget Sound, United States of America.

The first voyage was in September, 1905, and was made in 47 days net, which is unusually fast time. Upon leaving Hobart on this voyage it was the intention of the captain to sail to the south of New Zealand, a usual route, but unfavorable south winds forced a decision to go to the north. This route, which proved to have favorable winds, saved a considerable distance and about a week's time. Six days were consumed from Hobart to Cape Oton, New Zealand. From the north of New Zealand the course leads near the Cook Islands, Penrhyn, 40 miles east of Gardner Island and 30 miles west of Christmas Island, thence on a practically direct line to Cape Flattery at the entrance to Puget Sound.

Two subsequent voyages following the same general route and going north of New Zealand have been made, one in September, 1907, and the last in August-September, 1908. The second voyage consumed 59 days and the third 47 days from Hobart to Puget Sound. These are record trips and because of the unusual course sailed should be of considerable interest to Pacific mariners.

In the postscript of report to the hydrographic office, the captain of the Amiral Cecille writes: "I desire to call the attention of navigators, if these routes should become more general, to the dangers which are presented by the cliff 'Base des frigates francaises.' I found myself in a very dangerous position here, Sept. 21, at daybreak on account of the wrong position of this cliff on the chart, of which I have advised the officials in Paris. The most active watch could not discover the approach of danger. The breakers were running in an immense expanse. This cliff is very dangerous on all sides; at the west end the current and the northeast wind can drive a ship upon it by night. On the south end the sea is so shallow that it does not even break on the reefs."

THE NICHOLSON SHIP LOG.

Messrs. Barrett & Lawrence, of Philadelphia, eastern agents for the Nicholson Ship Log Co., have just received contracts to equip the U. S. S. New Hampshire, U. S. S. Montana and the U. S. S. North Carolina with the No. 1 Nicholson ship log. This makes a total of eight battleships and cruisers of the United States navy that this concern have equipped with the Nicholson log since last June, and the results that have been obtained have certainly been most interesting, as well as of very great value to the navigator and the commander of the ships. The Nicholson log is a very high-grade instrument and is proving to be all that has been claimed for it. The two new battleships Utah and Florida of the Dreadnought class, which are now under construction are also to be equipped with the Nicholson log. Messrs. Barrett & Lawrence report that there will be some 15 or more of the large steam yachts on the Atlantic coast that will be equipped with the Nicholson log some time between Jan. 1 and the fitting-out season, and that the foreign navies have called upon them for estimates for equipping their vessels. It is certainly very evident that the great value of the Nicholson log is being recognized all over the world, and it promises soon to become one of the standard equipment for all ships.

SUMMARY OF NAVAL CONSTRUCTION.

The monthly summary of naval construction, issued by the bureau of construction and repair, shows the following progress upon vessels:

Name of Vessel.	Building at—	—1908— Per Cent of Completion. Nov. 1.	Dec. 1.
BATTLESHIPS.			
South Carolina	Wm. Cramp & Sons	65.9	69.9
Michigan	New York S. B. Co.	74.9	79.4
Delaware	Newport News S. B. Co.	50.3	54.9
North Dakota	Fore River S. B. Co.	58.8	62.8
Florida	Navy Yard, New York	(No report)	
Utah	New York S. B. Co.	" "	
TORPEDO BOAT DESTROYERS.			
Smith	Wm. Cramp & Sons	57.5	59.9
Lamson	Wm. Cramp & Sons	56.2	58.5
Preston	New York S. B. Co.	52.0	54.9
Flusser	Bath Iron Works	33.0	40.9
Reid	Bath Iron Works	31.6	38.5
Paulding	Bath Iron Works	....	....
Drayton	Bath Iron Works	....	....
Roe	Newport News S. B. Co.	....	....
Terry	Newport News S. B. Co.	(No report)	
Perkins	Fore River S. B. Co.	" "	
Sterrett	Fore River S. B. Co.	" "	
McCall	New York S. B. Co.	....	....
Burrows	New York S. B. Co.	....	....
Warrington	Wm. Cramp & Sons	(No report)	
Mayrant	Wm. Cramp & Sons	" "	
SUBMARINE TORPEDO BOATS.			
Stingray	Fore River S. B. Co.	62.3	64.5
Tarpon	Fore River S. B. Co.	60.3	63.0
Bonita	Fore River S. B. Co.	57.8	60.8
Snapper	Fore River S. B. Co.	56.5	58.2
Narwhal	Fore River S. B. Co.	52.3	54.8
Grayling	Fore River S. B. Co.	52.0	53.5
Salmon	Fore River S. B. Co.	51.3	52.8
COLLIERS.			
Vestal	Navy Yard, New York	97.6	98.4
Prometheus	Navy Yard, Mare Island	87.8	94.0
TUG BOATS.			
Patapsco	Navy Yard, Portsmouth	81.0	86.0
Patuxent	Navy Yard, Norfolk	95.0	96.0

MONTREAL HARBOR FACILITIES AND THE ST. LAWRENCE ROUTE.

The completion of the construction of a series of 14 two-story steel structural sheds at the Montreal harbor was signalized, recently, by the ceremonial driving of the last rivet by the Dominion minister of Marine. At a subsequent luncheon, in shed 11, Hon. L. P. Brodeur said: "We have spent upwards of $150,000,000 in improving the St. Lawrence route, or considerably more than we have given in the form of subsidies to all the existing railways in the Dominion, omitting those built by the government. This immense sum, which comprises the capital outlay on canals, harbors and dredged channels, together with the excess of cost of maintenance over revenue from the beginning, has been laid out by two or more generations of Canadians, for the purpose of keeping Canadian traffic as far as possible in Canadian hands, and of enabling us to participate in the conveyance, by this great natural waterway, of the products of the American west to the Atlantic, in competition with the railways and the more or less artificial waterways of the United States. It has long been apparent, however, that in proportion to the quantity of export grain raised in the western and northwestern states then and now, the Canadian route is not carrying anything like so large a share as it should. The truth is that, like the Erie Canal, it has never been physically capable, in recent times at any rate, of meeting the requirements of the enormous traffic created by the rapid development of the west. When the Welland canal, the key of the route, was projected 90 years ago, the west, as then comprehended, did not extend beyond Lake Erie. The wheat belt of the United States was in northern New York and Ohio, while that of Canada was slowly advancing up the peninsula between Toronto and Windsor, but, in an incredibly short space, the whole face of things was altered by the onward march of civilization, and, though it was enlarged more than once, the Welland soon fell so far behind the procession of events that, as is now the case with the Erie Canal, the transportation interests began to prize it more on account of its usefulness as a regulator of rates in the navigation season than for its services as a carrier. The last enlargement was completed in 1887 and the canal is now 14 ft. deep, as are the canals between Prescott and Montreal. On the other hand, the natural channels in the upper lakes have been dredged to a depth of 20 ft. or more, and the Canadian and United States canals at Sault Ste. Marie, which connect lakes Superior and Huron, are of like capacity. Hence it has come about that most of the steam freighters on the upper lakes, the more recently built of which are capable of carrying nearly 15,000 tons in a single cargo, are excluded from the Welland, and consequently from Lake Ontario and Montreal, almost as effectually as though they belonged to another planet. They convey Canadian and United States grain to Buffalo, from which point it is portaged, so to say, by rail to New York, Boston and other United States ports. No vessel carrying over 75,000 bush. can navigate the Welland canal without first lightering at Port Colborne, whereas the big vessels on Lake Superior regularly take cargoes of 250,000 or 300,000 bush. to Buffalo. Moreover, within the last decade or two the United States railways, by improving their roadbeds and rolling stock, have put themselves in a position to transport wheat at a low rate from Chicago to New York, while our Canadian railways have established a lake-and-rail route via Lake Huron and Georgian Bay ports to Montreal. The grain, both Canadian and United States, is carried by vessels from Fort William, Duluth or Chicago to Midland, Depot Harbor, Collingwood, Owen Sound or Goderich, and conveyed thence by rail to the ocean steamer at Montreal, or, when the St. Lawrence navigation closes, to the ocean steamer at St. John or Portland.

"An enormous population has flocked to the region bordering the upper lakes, and industries have arisen which supply an immense vessel traffic, such as the iron ores and copper deposits and the coal and lumber trades, to say nothing of the progress of grain-growing in the northwestern states. On the Canadian side of the upper lakes we are making very satisfactory progress in mining and other lines of industry; whilst the wheat belt of North America is now centering in our prairie provinces. Beyond them lie the harvest fields of Alberta, which have begun to export wheat and flour to the orient. The stream of population from Europe, which till lately emptied itself almost exclusively into the United States, is now turning to the Canadian west, which is likewise profiting by a wonderful inrush of United States labor and capital, attracted by our cheap lands as well as by our good laws. There is authority for saying that in the last 10 years, or since what is termed the American invasion of the Canadian west began, United States immigrants have brought into western Canada and spent in the purchase and exploitation of farms, timber limits, elevators, mines, stores and what not, not less than $400,000,000, or far more than our net federal debt and the net debts of all the individual provinces combined.

"I am obliged to acknowledge, however, that, owing to the various causes just mentioned, the St. Lawrence route is not participating to the extent we once thought it would in the gigantic traffic moving every year between the west and the east. To be sure, whenever upper lake rates are abnormally low, it asserts its natural supremacy. This season wheat has been carried from Fort William and Duluth, through the Welland to Montreal, for from 3¼ to 4c per bushel, with corresponding quotations for other grains. These figures, which the lake-and-rail route by Buffalo to New York cannot approach, account for the recent large increase in the export grain trade of Montreal, which has created such consternation in New York. I need scarcely tell you that the government has given and will continue to give the closest study to a matter of such grave national moment. At present about 15,000,000 bushels of wheat from the Canadian northwest are shipped every year to Buffalo for export to Europe by New York, Boston, Philadelphia and Baltimore. Over and above this, some 5,000,000 bushels of Canadian wheat are carried to Portland for export. A considerable quantity of Canadian flour is also shipped to Europe from United States seaports.

"I do not suppose that, by the construction of the Georgian Bay canal and the reconstruction of the Welland, we could entirely stop the exports of Canadian produce from the United States seaboard. The Canadian northwest wheat, which goes from Fort William and Duluth to Buffalo, is carried there mostly by United States vessels at the tail end of the season, when Canadian vessels have all they can do on the Canadian routes. The Buffalo route, in short, is a second string to our bow, which on occasions is quite useful. But with these two new Canadian waterways we could certainly carry to Montreal in summer and to St. John in winter a vastly greater quantity of Canadian-grown wheat, together with a vastly greater

quantity of United States grain from upper lake points. In other words, the St. Lawrence would then become a truly important outlet for the produce of the United States northwest, besides receiving the great bulk of the constantly increasing yield of the Canadian west.

"The improvement of the St. Lawrence between Montreal and Quebec was undertaken 60 years ago, and the other day we succeeded in establishing a uniform depth of 30 ft., with a wider channel and with acetylene buoys that at night make it look like a well-lighted street. The result is that insurance rates on hulls and cargoes have been reduced, whilst by the improvements of the Montreal harbor, the harbor board has cut the cost of handling freight from the car to the vessel in two. Montreal, in fact, is now for the first time taking a proper place among the great seaports of the American continent. There has been a large increase in the ocean tonnage frequenting the St. Lawrence, and, in consequence, ocean rates have fallen to the advantage of the Canadian farmer, who exports, and of the Canadian consumer, who buys goods from abroad. You can form some idea of all that this means when I recall that Montreal is nearly 1,000 miles inland from the open Atlantic at the Strait of Belle Isle, and not long ago the channel between it and Quebec was only 10 or 11 ft. deep. No work of the kind in any other country—not even the conversion of Glasgow into a seaport by the deepening of the Clyde or that of Manchester through the construction of a ship canal—is more wonderful or more interesting from a transportation point of view. We cannot abolish the Canadian winter, which breaks the continuity of business on the St. Lawrence, obliging vessels to go elsewhere for five months of the year; but we have done everything that human ingenuity can suggest to minimize the natural drawbacks. Further, we have begun certain much-needed improvements in the river below Quebec, and shall devote attention to others, with the object of making that splendid port more efficient and more splendid still. To maintain Canada's rapid commercial development, its needs must be supplied as soon as possible. Montreal being at the head of 1,000 miles of inland navigation, it is essential that the largest ocean vessels come to this port. This can only be made possible by deepening the channel, by improving the lighting system, by establishing more and better buoys, and by placing for signals."—*Railway and Marine World.*

NEW CANADIAN SERVICES.

The *Shipping Gazette* publishes the translation of an interview which the London correspondent of the *Berliner Tageblatt* has had with Herr Ballin on the subject of the agreement concluded between some of the Continental shipping companies and the Canadian railways.

Herr Ballin laid particular emphasis upon the importance of the inclusion of the Grand Trunk railway in the agreement. Both the Canadian Pacific and the Grank Trunk, he said, shared equally in the arrangement. Thus the German shipping companies were brought into the closest touch with the great grain reservoirs of the north of Canada, and with the land reserves which had just been opened to colonization in the northwest as far as British Columbia, as well as with the overland connection with the Pacific.

Between the two railways, Herr Ballin remarked, there is great rivalry, and the success of the effort to bring them into one agreement is all the more remarkable, because a clause was laid down by which the Canadian Pacific, in the apportionment of goods and the fixing of rates—in fact, in every relation—has to treat the new steamship service as one of its own undertakings. The shipping companies which, in addition to the Hamburg-American Line, are parties to the agreement are, Herr Ballin said, the Norddeutscher Lloyd and the Holland-American Line.

Provisionally Herr Ballin seems to attribute chief importance to a probable increase in the emigration traffic, which for the ensuing year will establish a record. Thus the entry of Germany into Canadian business has taken place, in his judgment, at the psychological moment. Herr Ballin stated that he had had a long conference with Mr. Lemieux, the Canadian minister of posts, who promised his energetic support to the new service, although, of course, the Canadian mails to Northern Europe would for the present be sent via England.

Mistrust on the part of the English shipping lines Herr Ballin did not regard as probable. The German lines, he said, had for a long time had a claim to a proportion of the Canadian business. This new departure had been expected, and was indeed long overdue. The sailings of the new line would be fortnightly in dull times and weekly during the season.

"Finally," says the *Berliner Tageblatt's* correspondent, "Herr Ballin gave me some highly important information, which, however, for the greater part, must be discreetly handled, regarding the substantial progress which had been made with his plan for an international understanding for the laying up of old ships and for a common sailing program in the trans-Atlantic trade. I can, however, state that on this matter negotiations have taken place recently in London, which led to an agreement in principle between all the interested lines, and that perhaps next year definite decision is to be expected. In spite of the general good will which was displayed, the negotiations led to no actual conclusion because of a difficulty, which lies, however, quite outside the main problem."

REPAIRS TO NAVAL VESSELS.

Washington, Dec. 10.—$4,154,500 is asked of Congress by Secretary Newberry of the navy for the repair of ships during the fiscal year 1910 in cases where the expenditure upon each vessel will exceed $200,000. The list is forwarded to Congress under the requirement of the appropriation act of March 2, 1907. New boilers are to be installed in some cases and in others old boilers are to be retubed. General overhauling is contemplated in many cases, notably in the six cruisers of the Chattanooga type commissioned—one in 1903, one in 1905 and the other in 1904. An appropriation of $520,000 in addition to $200,000 contained in the bill passed May 13 last year is asked for the Maine, which will have new boilers and other repairs of a general character. Retubing of the boilers of the Missouri and Ohio, with other repairs, is estimated to require $540,000 in each case. General overhauling of the Chattanooga, the Cleveland, the Denver, the Des Moines, the Galveston and the Tacoma is estimated at $210,000 each. New boilers for the Concord and the Yorktown will cost $152,000 each.

NO MORE DISCUSSIONS.

Secretary of the Navy Metcalf has recently issued an order by direction of President Roosevelt, the purport of which is such as to prohibit the further discussion by naval officers of the results of the Newport conference regarding battleship defects.

This order rescinds one made a few weeks ago by which the privilege was given to naval officers to make public such information as they chose regarding the Newport conference.

The president has now concluded that the publication of the discussions regarding alleged defects in battleships will not serve any good purpose.

Merchant Marine League Campaign.

An important meeting of the Merchant Marine League of the United States was held in the library of the chamber of commerce Thursday, Dec. 3, being preceded by a luncheon. President Joseph G. Butler, Jr., of Youngstown, presided. It was decided to begin at once an aggressive campaign for the passage of the act extending the provisions of the ocean mail bill which was defeated by just three votes in the last congress. The league regards this bill as one of the most effective and yet most modest that has been advanced in behalf of the American merchant marine in the over-sea trade. It projects three new lines from Atlantic coast ports to South America and three from Pacific coast ports to the Orient, but specifically provides that no more money shall be expended in the projection of these lines than the surplus now expended on sea postage. The annual earnings of the postoffice department on sea postage run from $3,500,000 to $4,000,000. Had the bill passed at the last session, it would have called for the construction immediately of 36 ocean-going steamers, an order which would have stimulated the industries of the country greatly and hastened the return of prosperity. This bill passed the senate unanimously, and a change of only three votes would have carried it through the house.

After ratifying and approving the selection by the committee of elections of Joseph G. Butler Jr. as president, to succeed Harvey D. Goulder, resigned, the league resolved to pursue at once an earnest campaign in the districts of doubtful congressmen. A Republican defection sufficient to defeat the measure was, as is well known, led by Congressman T. E. Burton, of Cleveland. The league has received abundant assurances that this attitude on the part of Congressman Burton was not endorsed by his constituents. In fact, his attitude was in direct opposition to the wishes of the administration, to the planks of the national platform, and to the desires of the citizens of Ohio as expressed at the polls.

The league elected former Governor Herrick as first vice president. Governor Herrick in his remarks said that the late Senator Hanna had waged his campaign for the senate on the merchant marine alone and had been elected by the highest majority ever recorded in an Ohio campaign.

James H. Dempsey submitted a brief and revised constitution for the league, designing its object as simply the promotion of the American merchant marine. The organization is non-partisan in every particular. The constitution also empowered the president to appoint an executive and finance committee of 15, under the general supervision of which the work of the league will be carried on.

The membership of the league embraces every state in the Union and no time will be lost in projecting a general campaign of education. As congress convenes within a few days and the session is very short, it is hoped that through its offices the ocean mail bill will be passed before next March.

The officers of the league are: President, Joseph G. Butler Jr., Youngstown; first vice president, Myron T. Herrick, Cleveland; treasurer, Col. J. J. Sullivan, Cleveland; secretary, John A. Penton, Cleveland.

SHIP BUILDING DURING NOVEMBER.

The bureau of navigation reports 55 sail and steam vessels of 9,166 gross tons were built in the United States during November, 1908, as follows:

	Wood.				Steel.			
	Sail.		Steam.		Steam.		Total.	
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	7	6,628	20	343	3	976	30	7,947
Porto Rico	..	.....	..	.....	..	.....	..	.....
Pacific	..	.....	8	732	..	.....	8	732
Hawaii	..	.....	..	.....	..	.....	..	.....
Great Lakes	..	.....	6	79	2	284	8	363
Western rivers	..	.....	8	117	1	7	9	124

FLOATING DOCKS.

Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne, have sent to us a book descriptive of their floating docks illustrated with excellent protogravures in sepia tones. Quite a number of illustrations are given of the various types of floating dock constructed by this company. As is well known, the company has made a specialty of this form of construction and its docks are to be found in all quarters of the world. The book illustrates the Durban dock built for the government of Natal, South Africa, the sectional dock for the harbor of Callao, Peru, the box dock at Port Said, the sectional pontoon dock at Lagos, Nigeria, the Bermuda floating dock, the Trinidad floating dock, and many others.

NEW SHIP BRAKE.

By direction of the President a brake apparatus is to be installed on the battleship Indiana. This ship brake, the invention of Pierre La Coste, a Canadian, and relative of Chief Justice La Coste, of Canada, has been in use in Canadian revenue cutters, and is said to have been satisfactory. Its function is to bring a vessel to a quick stop in case of necessity, or bring about a sharp turn when the maneuver is desired. The brakes are virtually wings from 4 to 6 ft. wide and 12 ft. deep, one on each side of the vessel, placed in the water beginning at the water line. They fold forward, and when not in use the side of the vessel presents a smooth surface to the water. Control is obtained from the bridge of the vessel by a pneumatic arrangement, which releases the brakes and brings them back to their places after the maneuver has been carried out.

BATTLESHIP CRUISE.

Contrary to the program heretofore tentatively announced, the battleship fleet will not rendezvous at New York to give shore leave to the men, after leaving Hampton Roads, where they are to be reviewed by President Roosevelt on Feb. 22. Instead the ships will be inspected at Hampton Roads to ascertain what repairs are necessary and will then proceed in divisions to their "home" yards. The department is of the opinion that the majority of the men have had a surfeit of entertainment on their trip and will be glad to get to their home ports to rejoin their families. However, a full squadron of eight battleships will remain at Hampton Roads for two weeks and from these vessels the 2,500 officers and men to come to Washington for the inauguration will be detached. The usual amount of shore leave will be given those remaining aboard the ships. The ships of the fleet eventually will find their

way to the Boston, New York, League Island and Norfolk yards for the repairs to be made to them.

WOOD FROM FORTY-SIX STATES.

A block of wood from each of the 46 states of the union will enter into the construction of the new lake and ocean steamer now being built at Manitowoc, Wis. On this boat there will be 46 rooms, unless between now and spring the territory of New Mexico should become the state of Lincoln, in which case there will be 47, and each stateroom will bear the name of a great commonwealth of this nation. In a specially planned panel between the staterooms in the main cabin there will be a photographic portrait of the governor of each state in office at the time the boat is put in service next May. The cabin of the steamer has been planned to show the history of this country in pictures and tablets, so that it will fairly bristle with patriotic sentiment.

In the matter of pictures, the most striking events of our wars on water, as well as the most peaceful incidents, will be reproduced in oil. Among the views to be shown will be the landing of Columbus' caravels, the landing of the Pilgrim fathers from the Mayflower, the naval victory of Perry on Lake Erie, of Farragut at Mobile, the great fight between the Merrimac and the Monitor, and in recent history Dewey's battle at Manila.

Another historic feature that has been planned will be carried out on small brass plates that will occupy panels in the interior finish of the main cabin. Each plate will bear a patriotic extract from the sayings of the great men of the country from Washington down to Taft.

The 46 blocks of wood which are to be secured from each state will be carved in their exact geographical shape to represent state secured from and all be put together in one mammoth map to occupy a section of the cabin.

The boat is to be called the United States, the flag and the shield are to be shown on the top deck at night in red, white and blue electric lights.

The steamer is being built by the Manitowoc Dry Dock Co. as a companion ship of the Theodore Roosevelt, owned by the Indiana Transportation Co., of Chicago. She will operate between Chicago and Michigan City, Ind., but the draught and size of the ship has been limited so as to make her available for navigation on the deep waterways from the lakes to the gulf as soon as the same can be open.

The Indiana Transportation Co. has decided on the name and will use the patriotic ideas in conformity with the suggestions received at different times from people who have traveled on Lake Michigan. The United States will be launched on Feb. 22 next.

PONTOON DOCK FOR ROBINS CO.

The new dry dock of the John N. Robins Co. of Erie Basin, one of the largest movable structures of the kind ever built in this part of the country, was towed to the Robins yards from Thirty-second street, Brooklyn, last week. It was perhaps the largest dock ever towed through the waters of New York harbor, being 365 ft. long, over 100 ft. wide over all, and with a depth of 11 ft.

It is the first pontoon dock, with steel wings, to be built in the United States, and is designed for a lifting capacity of about 6,000 tons. The steel wings are 30 ft. high, 335 ft. long, and contain upward of 1,000 tons of steel. The dock is pumped by 20 12-in. centrifugal pumps, driven by two electric motors of 300 H. P. each. The work on the dock began April 15, this year, and its delivery complete in every respect is a new record in American steel construction.

The pontoons which comprise the lifting power of the dock are of wood, and 1,500,000 ft. of yellow pine lumber were used in their construction. William T. Donnelly, of 135 Broadway, is the engineer who designed the dock.

PARSONS TURBINES FOR THE FLORIDA.

Secretary of the Navy Newberry has decided that the machinery of the battleship Florida, which is to be built at the New York navy yard, shall be of the Parsons turbine type. In his directions to the bureau of steam engineering the secretary says:

"The recommendation of the bureau contained in the preceding indorsements is approved, for the reasons stated therein and for the further reason that the navy department already has under contract 172,000 horsepower of Parsons turbines, and as our navy yard employes will have to do all the repair work that may be necessary on the vessels that are being equipped with turbines of this make, it seems advisable that they should become familiar with the manufacture of them. The proposal of the Parsons company is a duplicate of that to be manufactured at the New York Ship Building Co.'s works and has already been installed on other vessels. In view of the further fact that there are five ship yards on this coast where mechanics are all more or less familiar with the construction of the Parsons turbine, this would indicate that experienced mechanics familiar with this type of machinery could be secured at any time."

WANTS 14-IN. GUN.

Rear Admiral Mason, chief of the bureau of ordnance of the navy department, in his annual report, made public Dec. 5, states that the 12-in. guns mounted on the eight latest American battleships are equal or superior in power to any 12-in. gun yet afloat anywhere in the world. The 12-in. guns to be mounted on the battleships in course of construction, he declares, will be equal or superior in power to any 12-in. foreign gun of which he has authentic information.

Anticipating the possible need of a more powerful weapon than any now in use he favors the partial remodeling of the naval gun shop factor at the Washington navy yard in order to construct an immense 14-in. gun designed to fire a 1,400-lb. projectile.

Writing of the attitude of the Du Pont Powder Cos. he says: "The capacities of the government plants are probably now such that, during the continuance of peace the government may be considered nearly independent of the Du Pont Powder Cos. and there is no danger of its having to purchase at exorbitant prices."

Speaking of the firing tests on the monitor Florida last spring, he says it was shown that the mechanism of the turret and the apparatus within it could not be injuriously affected by the greatest shock of impact which the turret armor was capable of withstanding. The experiments also demonstrated that the underhull construction of our latest type battleships is well adapted to resist a torpedo explosion.

The British Admiralty court has awarded $37,500 salvage to the British steamer Sidra, of which amount $30,000 goes to the Sidra's owners, $3,000 to her captain and $4,500 to the ship's company. The award was made in consideration of the Sidra's rescue under most dangerous conditions of the French steamer Breiz Huel, she having stood by the disabled vessel for eight days, towing her a distance of 650 nautical miles and finally fetching her into Bermuda.

THE MARINE REVIEW

DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Co.
CLEVELAND.

BOSTON.....73-74 Journal Bldg.
BUFFALO.....932 Ellicott Sq.
CHICAGO.....1328 Monadnock Blk.
CINCINNATI.....First National Bank Bldg.
NEW YORK.....1005 West Street Bldg.
PITTSBURG.....510 Park Bldg.
SEATTLE.....302 Pioneer Bldg.

Correspondence on Marine Engineering, Ship Building and Shipping Subjects Solicited.

Subscription, U. S. and Mexico, $3.00 per annum. Canada, $4.00. Foreign, $4.50. Subscribers can have addresses changed at will.

Change of advertising copy must reach this office on Thursday preceding date of publication.

The Cleveland News Co. will supply the trade with the MARINE REVIEW through the regular channels of the American News Co.

European Agents, The International News Company, Breams Building, Chancery Lane, London, E. C., England.

Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.

December 17, 1908.

THE PRESIDENT FOR THE OCEAN MAIL BILL.

President Roosevelt's message to congress this year is chiefly a long review of the work of his administration, a valedictory as it were. Of specific, pointed recommendations there are few, but one of these is gratifying to the friends of the merchant marine. It is an emphatic demand for the enactment by this present congress of the Gallinger ocean mail bill:

"I again recommend the extension of the ocean mail act of 1891, so that satisfactory American ocean mail lines to South America, Asia, the Philippines, and Australia, may be established. The creation of such steamship lines should be the natural corollary of the voyage of the battle fleet. It should precede the opening of the Panama canal. Even under favorable conditions several years must elapse before such lines can be put into operation. Accordingly I urge that the congress act promptly where foresight already shows that action sooner or later will be inevitable."

This declaration is reenforced by a longer statement of the case in the annual report of Secretary Straus of the department of commerce and labor. The ocean mail legislation has been asked for by the post office department. Another and particularly weighty appeal is made in the annual report of Honorable John Barrett, director of the international bureau of American republics. Mr. Barrett puts a swift and regular steamship service as the very first essential of improved commercial relations with the Latin-American markets.

These admonitions, coming all together, ought to stir to immediate action the post office committee of the house of representatives. It was on March 20 last that the senate passed the ocean mail bill without a division. The house committee did not see its way clear to report the bill last spring, and the house itself by a very narrow vote refused to accept the senate bill as a part of the post-office appropriation bill in conference. But there is now ample opportunity for the consideration of this legislation by the post office committee and the house, and it ought to be brought up and enacted very soon after the holiday recess. It is a good many years since any legislation whatsoever calculated to improve our ocean mail service has been introduced in the house of representatives on the initiative of the post office committee. Meanwhile foreign nations have gone on steadily improving their postal facilities, and possessing themselves of the markets of Latin-America and the Orient. These foreign nations virtually monopolize the meager facilities for transportation of mails, passengers and freight from our ports to South America, and they are making a hard fight to drive us completely off the Pacific ocean. A powerful foreign steamship combination controls the west coast trade to South America and another the east coast trade. A majority of the members of the house post office committee are men from the middle western country, and if they fail to sustain President Roosevelt's recommendation they will find it difficult to justify themselves to their constituents.

REVISING THE TARIFF.

In considering the taking off of the tariff on iron ore, pig iron and steel, equity demands that consideration should be given to certain vital points, the chief of which is the labor cost. This country has experienced during the past ten years a condition of prosperity little short of a business millennium. When the Dingley tariff, under which the country is now operating, went into effect, the price of labor was low. Since then there has been a constantly ascending scale of wages. It costs more to take the ore out of the ground, it costs more to bring it down to Lake Erie ports, it costs more to transport it to the furnaces and it costs more to handle it at the furnaces. This labor cost has grown enormously. Even the rough labor at the furnaces which ten years ago could be secured at 75 cents a day is now being paid from $2 to $2.50. How can there be a radical disturbance of the tariff without a corresponding disturbance of wages? To reduce the tariff is not as simple a proposition as it seems. It means readjustment of cost through a long line of co-related enterprises, and it cannot be accomplished without disturbing the schedule of wages. Labor has profited during the past decade; and so has capital, but the rewards of capital have largely accrued from the volume of output rather than upon the profit per ton. No one wants to see a reduction in the wage scale if it can be avoided.

PLEA FOR COLLIERS.

God bless us all, but God bless especially Rear Admiral William S. Cowles, chief of the bureau of equipment of the navy department, who in his annual report just published had the courage to state that had foreign complications arisen or had a combination been effected between foreign

ship owners, our fleet of naval vessels on the world cruise might have had to remain lying helpless in some foreign port. He recommends that immediate steps be taken to supply an adequate number of colliers for the navy. He thinks there should be at least one for every two units, with sufficient capacity for supplying four vessels. The surest means of supplying colliers to the fleet would be the passage of such legislation as would enable American citizens to make a living in over-sea shipping. It is about time that our present dependent and helpless condition was brought to an end.

CLOSE OF LAKE SEASON.

Well, the lake season of 1908 is done, with the exception of the W. D. Rees' trip from Milwaukee to Escanaba for a return cargo of ore, and the possible trip of the stranded steamer James E. Davidson from Kettle Point to Buffalo with grain, and a miserable season it has been, with probably 40 per cent of the available fleet inactive. Even of the active fleet, many were operated at a loss and the best that the most of owners expect is do is to take care of bonds and interest. A few, of course, will distribute a little money among the stockholders, but there won't be much of this. There was an oversupply of tonnage at all times, notwithstanding the fact that wild vessels did not begin to operate until July, and that several of the vessels of leading shippers did not operate at all. As it was, shippers had little trouble in taking care of the bulk of the ore movement in their own vessels. It was not uncommon for a large freighter to come down light for coal, and the profit in carrying coal for 30 cents to the head of the lakes and coming down light is too small to be seen with the naked eye. Several vessels of the independent fleet were tied up all year and two that were finished did not leave the ship yard. Not only were carrying charges on ore 10 cents less, but there was no fluctuation in the rate. It opened and closed at 65 cents. Moreover, no advance was paid on coal, even the steamer J. E. Upson leaving Cleveland, Dec. 11, with coal for Milwaukee at 40 cents. Formerly a dollar would have been paid for such service. The grain trade, however, took a spurt in the closing days and 4 cents was paid from Ft. William to Buffalo.

The Pittsburg Steamship Co. has lined up its engineers with individual contracts for 1909, a practice that was inaugurated in 1908. The very excellent co-operative plan of the Lake Carriers' Association, one of the broadest and best ever advanced, is meeting with condemnation from the sources which it is most calculated to benefit, but such is the way of the world, especially the union labor world.

PIG IRON SITUATION.

Eastern furnace interests have purchased a large tonnage of foreign ore for 1909 delivery, in all about 600,000 tons, both Spanish and Nova Scotian ore. Sales of pig iron have been moderate, prices being well maintained, especially on iron for the first half of the year. The Chicago, Burlington & Quincy has been in the market for 40,000 tons of rails, and eastern railroads have also bought smaller tonnages this week. Eastern and middle western railroads have ordered steel cars, as well as some locomotives. Contracts for structural material have not been numerous. Rain has greatly improved conditions in the coke regions, and some contracts for foundry coke are being made, including one for 4,000 tons for the full year at $2.50 per ton. In some centers, scrap iron shows a tendency toward weakness.

LARGE GRAIN FLEET AT BUFFALO.

Brown & Co., of Buffalo, writing to the MARINE REVIEW, say: The last of the winter grain fleet except the steamer James E. Davidson, has arrived. In all there are 66 steamers in the fleet; 26 of them found winter dockage in Buffalo creek or the Blackwell canal, mostly small and medium-sized boats. There is not an available dock for another loaded boat inside the piers, large or small. Thirty boats, including nearly all the largest, will winter in the outer harbor; that is, under the protection of the breakwater. This is the largest grain fleet that ever wintered in Buffalo, there being about 17,000,000 bu. of grain afloat here.

OBITUARY.

Capt. M. H. Murch, who died at Lakewood hospital, last week, was well known and much respected among the older generation of lake masters. He had lived a very active life until his retirement a few years ago, and had filled many positions of prominence as ship builder, ship owner and sailing master. He was born in Ellsworth, Me., Sept. 13, 1827, and went to sea at the age of 11 years. He came to Cleveland in 1854, though, prior to that time, he had worked in the ship yards of the coast. His first employment on the lakes was at the Moses ship yard on Euclid creek, where a number of the old sailing vessels were built. The steamer Iron City was his first command and later sailed steamers of the Northern Steamship Co., then known as the Hall line. He was with this company for many years and he looked after the construction of many of its vessels, notably the Northwest and Northland. The steamer Northern Light was the last boat he sailed, though for a number of years thereafter he continued to act as shore captain. He was also interested in the construction of the ferry steamers Duluth and Superior, operating in the Duluth-Superior harbor. These vessels were later placed on the run between Cleveland and Euclid Beach. He is survived by a widow and three children, Mrs. W. K. Hutchins, of Oberlin; W. F. Murch and M. H. Murch, of Cleveland. The interment was at Lake View cemetery, the funeral being generally attended by vessel owners and masters.

Mr. C. E. Hibbard, dock superintendent for Pickands, Mather & Co., at Ashtabula, died suddenly last week.

Robert Baygess, second engineer of the steamer Algonquin, was killed Dec. 9 by falling between the steamer and the dock.

Capt. John H. Way, an old-time lake captain, died at his home, Waterford, N. Y., this week at the age of 82 years.

Capt. Conrad C. Reid, former lake master, died at his home, No. 95 Page avenue, East Cleveland, this week.

PERSONAL.

The Detroit Club, of Detroit, will hold a reception at noon Christmas day, for its distinguished fellow-townsman, Mr. Truman H. Newberry, secretary of the navy.

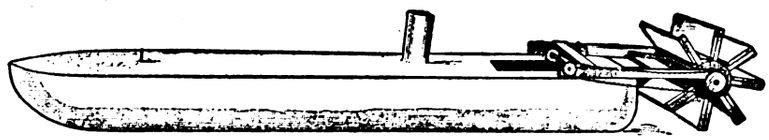
The steamer Theodore H. Wickwire, building for the American Steamship Co., of Buffalo, and to be managed by Boland & Cornelius, will be launched at the Ecorse yard by the Great Lakes Engineering Works on Saturday next.

The Port Arthur grain elevators did an enormous business during the season just closed, practically double that of 1907. The figures for the year are: Receipts, 17,020,891 bu.; shipments, 17,248,905 bu. In 1907 the receipts were 9,596,421 bu., and the shipments 11,378,777 bu.

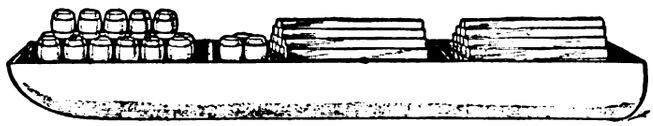
A NEW USE FOR CONCRETE.

Perhaps the most unique and surprising development in the use of concrete in recent years, is the use of this material in boat building. The discovery of the merits of reinforced concrete for boat building, however, is as old as reinforced concrete itself. We find in searching the early history of reinforced concrete that M. Lambot, a Frenchman, constructed the first reinforced concrete structure, a boat, in the year 1850 and in 1855 exhibited it at the Paris Exposition. The honor of the discovery of the properties of reinforced concrete is usually credited to M. Joseph Monier, a Parisian gardener, but M. Lambot's patent dated 1855 shows conclusively that the credit belongs to him instead of Monier whose first work was done in 1861.

In 1896, an Italian firm, the Signori Gabellini of Rome, built a 150-ton reinforced concrete barge for use on the Tiber. This barge proved so successful that a number of other boats have since been built in France and Italy.



The power propelled boat has been built 1-60th of its size to carry a burden of 300 tons.



The Concrete Barge model 1-45th of its size to carry 300 tons.

This industry, which is rapidly developing in Europe, should induce American enterprise to construct boats for American inland waters, especially for coast-wise trade.

The Moechel & Lowther Engineering Co., of Kansas City, has made a very thorough investigation relative to the use of concrete boats for carrying freight on the Mississippi and Missouri Rivers. This company constructed two models, one a power-propelled concrete boat, and the other a freight barge. These were placed on exhibition several months ago in a tank of water. They showed remarkable buoyancy and stability. They are the "curiosity" of the passersby, whether pedestrians, in carriages, or on the street car. The accompanying illustrations show these models which are made in a proportion of 1-60 actual size of a power-propelled boat of 300 tons burden and 1-45 of the actual size of a barge of 300 tons capacity. Designs have been made by the Moechel & Lowther Engineering Co. for a barge 150 ft. long and 30 ft. wide drawing 3½ ft., carrying under a full load about 300 tons. This barge was designed especially for Missouri river transportation, 3½ ft. being the maximum safe draught on this river in low stage of water. Estimates from designs show that these boats can be built at half the cost of steel or about the same cost of wooden boats. Where a number of boats are built from the same forms, the cost is even less than for wood. These boats never have to be painted and repairs caused by accidents can easily and quickly be repaired by the crew, carrying on board a few bags of cement and sand. The boats are furnished with water-tight compartments which make them practically unsinkable and as concrete improves with age, the life of a concrete boat should be practically unlimited. The effects of shocks, such as are caused by docking and being fouled by sand bars have been carefully considered in these designs. It is believed that a concrete boat properly designed will not suffer as much damage as a wooden or steel boat under like circumstances. This also has been proven by experiments made by the Italian government in causing a concrete vessel. In that trial, the concrete boat suffered much less than did the steel boat by this intended encounter. This, and like experiments made by the Italian naval experts has led their government to adopt a reinforced concrete belt for armoring its warships. This extreme test should convince the most skeptical that concrete, properly reinforced, will answer admirably for boat building. It is a safe conclusion that the great victories achieved by concrete structures built on land will at least be equalled by floating structures built on rivers, lakes, and possibly high seas. How greatly such a construction will advance the river and lake trade of our country, we will leave to our readers to guess. Cheapness, utility and strength, and practically indestructibility by time, is a combination of quality possessed by one material only—concrete.

YANKEE SINKS AGAIN.

The stranded United States cruiser Yankee was floated off the Hen and Chickens Reef in Buzzards' Bay, where she had rested for 10 weeks, on Dec. 4, by means of the compressed air process of the millionaire coffee merchant, John Arbuckle, who took the contract for floating her. Unfortunately the weather was unfavorable when the attempt to tow the Yankee to port was begun and the hawsers broke repeatedly. During an endeavor to attach a towline to the vessel one of the tugboats was lifted by a great wave and smashed against the side of the cruiser, breaking in a port and flooding the apartment where the air compressors were at work as well as putting out the fires under the boilers. Deprived of power with which to operate the pumps of the leaky ship she began to sink and went to the bottom before she could be beached.

Although the Yankee's present position and condition are most unfavorable it is the opinion of wreckers and naval officers that her second raising will prove to be a much less difficult task than was that of releasing her from Spindle Rock of the Hen and Chickens Reef.

Mr. Arbuckle has stated his intention to make an attempt to rescue the cruiser from her present position, which he believes is better than that which she previously occupied. The Yankee now lies in 42 ft. of water.

FINANCE'S CAPTAIN EXONERATED.

The Board of United States Steamboat Inspectors at New York has exonerated Capt. M. W. Mowbray, of the Panama Railroad Co.'s steamship Finance, sunk by the White Star liner Georgic, from any blame for the accident, declaring that he had taken all necessary steps for the protection of his passengers. Capt. Mowbray was also commended for compelling some of his crew at a pistol's point, to give up a life boat to women and children when the Finance was sinking. No attempt was made to pass upon the conduct of the captain of the Georgic as she is a British vessel and her side of the case must be investigated by the British Board of Trade.

The Finance is a total loss.

PACIFIC COAST NOTES.

Office of the MARINE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Dec. 12.

The leading event of the week in Pacific coast marine circles is the purchase of the Atlantic coast steamer St. Croix from the Enterprise Transportation Co., Boston, by Shubach & Hamilton, Seattle. Shubach & Hamilton will enter the St. Croix in the Seattle-Nome passenger trade in competition with the established lines. Shubach & Hamilton were engaged in the freight traffic between Seattle, Nome and other northern Alaska ports last season and were unusually successful. The St. Croix will leave Fall River early in January and is expected to arrive in Seattle some time in March. Upon arrival she will be overhauled. The St. Croix is a wooden, single-screw steamer of 1,993 gross and 1,054 net tons, 240 ft. long by 40 ft. beam, equipped with 2,700 H. P., triple-expansion engine, bunker capacity for 200 tons of coal, four boilers and duplicate dynamos and feed pumps. She has a license for 500 night and 800 day passengers. Her speed is 17 knots, with easy going at 14 knots, which will make her one of the fastest boats on the Nome run.

The Puget Sound Navigation Co. is considering the construction of a fine new turbine passenger steamer, somewhat on the lines of the H. B. Kennedy, for the Puget Sound trade. The new steamer as planned will have a steel hull, triple screws, a speed of 21 knots, and turbine engines. The new boat will be one of the largest exclusively passenger steamers on this coast and the first one on the North Pacific to be equipped with turbines. The estimated cost is $300,000. Several Pacific coast yards are figuring on the job. The Puget Sound Navigation Co. will present the cabin plans and ask the bidders to submit their own models. Seattle ship yards will be given the preference in the work. She will be 200 to 250 ft. in length and it is hoped that she will be in service during the summer of 1909.

The steamer Princess Charlotte, built for the Canadian Pacific service between Seattle and British Columbia, is making a smart passage out from the Clyde. She was reported at Coronel last Saturday and is expected to arrive in Victoria on Christmas.

The Canadian Pacific Ry. Co.'s steamer Charmer collided with a heavily loaded coal barge about noon, Dec. 3, and, leaking badly, was beached at the entrance to Vancouver narrows. The Charmer collided with the corner of the scow and before she could be disengaged the sharp iron bound edge of the barge ripped a hole 25 ft. long in the starboard side of the hull just abaft of the forward bulkhead. The Charmer was later floated by the salvage tugs William Jolliffe and Salvor and towed to Esquimalt (Victoria) for repairs. Repairs will be made as rapidly as possible.

The Moran Co. has completed its contract on the steamer Chippewa, which has been thoroughly overhauled. This company will also repair the steamer Northland, damaged last week by striking a reef, the contract to be finished in 10 working days. This company has done fast work on the steamer Cottage City, which has had her fore-hull practically rebuilt and she will be finished about 10 days ahead of the time allowed by the contract.

The coasting steamer Ponting, carrying a large number of laborers from Narvacan to the rice fields of Panagasinan province, Philippine Islands, struck a reef, Nov. 27, and sank during a storm off San Fernando in Union province. It is estimated that 100 passengers and crew of the Ponting were lost. The steamer Viscaya rescued 55.

The steamer Indianapolis is still off her Tacoma-Seattle run undergoing repairs. The engine foundations are being rebuilt by the Commercial Boiler Works. The work will cost $10,000 and must be completed by Dec. 20.

The customs and steamboat inspection officers of Seattle have moved into their new quarters in the new federal building on Fourth avenue and Union street.

Bids for making extensive repairs on the steamer Alki have been forwarded to the San Francisco offices of the Pacific Coast Steamship Co. for award. John B. Mitchell, Seattle, is the lowest bidder, his tender being $15,230. The specifications call for overhauling the boilers, new ceilings and keelson, and new bridge deck.

The route of the Great Northern Steamship Co.'s big liner Minnesota has been extended to include Manila. The route westbound hereafter will be as follows: Seattle to Yokohama, Kobe, Nagasaki, Shanghai, Manila and Hongkong. Eastbound the route will be: Hongkong to Nagasaki, Kobe, Yokohama and Seattle.

After an adventurous voyage including a collision in the south Atlantic and six weeks' buffeting by heavy gales off Cape Horn, the British bark Haddon Hall arrived at Victoria, B. C., Dec. 7, 245 days from Liverpool. She is in a badly battered condition.

THE MORAN CO. CONTRACTS FOR SUBMARINES.

Bidding through the Electric Boat Co. of Quincy, Mass., the Moran Co. of Seattle was recently awarded a contract by Secretary of the Navy Truman H. Newberry for the construction of at least two submarine boats. The Electric Boat Co., which controls the patents covering the design of the boats, was awarded four boats to be built on the Pacific coast. Two of these will surely be built at Seattle by the Moran Co., with the possibility that the other two will also be constructed by the same firm. The prices for the construction of the boats on the Pacific are $446,000 to $461,000 for 435-ton boats and $388,000 to $401,000 for 375-ton boats. The boats to be built on the Pacific coast are of the Octopus type. If only two of the four boats to be built on the west coast are constructed at Seattle, the other two will be built by the Union Iron Works, San Francisco. It is probable, however, that all four will be built on the north coast.

NEW YORK MUST OPERATE FERRIES.

Justice Blackmar, in the supreme court, Brooklyn, recently granted with certain restrictions, a writ of mandamus against the city of New York, brought by Everett E. Wheeler as a taxpayer, the writ making the city of New York responsible for the maintenance and operation of the five ferry lines between Manhattan and Williamsburg.

Justice Blackmar directs however that the leases shall be offered at public auction until the lines are taken off the city's hands. If the city should be unable to lease the ferries to private interests further remedy must be sought through voluntary action on the part of the city, or in the legislature, the court holding that despite the building of bridges the ferries are still a public necessity and convenience.

ATLANTIC COAST NOTES.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

Exceptionally heavy weather is being encountered by westward bound trans-Atlantic liners. The White Star liner Celtic on arrival at New York reported the carrying away of a section of the starboard rail during the passage, the big vessel having encountered heavy head seas from the Irish coast to the Banks.

The White Star Line has announced its intention to withdraw the steamers Victorian and Armenian from the New York service because of the cattle plague. Other alterations in the service relate to the days of sailing from New York and Liverpool. The three freighters remaining on the service will sail from New York, Dec. 16, 23 and Jan. 6, and from Liverpool, Jan. 2, 9 and 23.

According to Senor Emilio Tomassi, general agent of the Spanish Trans-Atlantic Line, there will soon be steamships in the trans-Atlantic service under the flag of Spain that will compare favorably with the best of other nations in the service. Senor Tomassi reports a mail subsidy bill now before the Cortes in Spain which, if passed, will enable his company to build such ships and establish a direct line from Cadiz to New York on weekly service. He also predicts that Spain will in a very few years have a merchant marine of no small account, and says the bill is looked on with favor.

The tugboat Anthracite, which was run down and sunk by the transport Maryland, off the Battery last week, was raised by the Merritt-Chapman Wrecking Co. the following day and taken to Erie Basin. The bodies of the engineer and cook of the tugboat were recovered.

Edward P. Morse, of the Morse Iron Works, South Brooklyn, has filed a voluntary petition in bankruptcy in the United States court, owing to his inability to pay $135,000 liabilities of the old Morse Dry Dock & Repair Co.

The steamer Karthago, of the Hamburg-America Packet Line, arrived at St. Johns, N. F., on Dec. 9, to replenish her bunkers. The Karthago encountered terrific weather, part of her cargo having to be sacrificed owing to its having shifted. Two of the vessel's lifeboats were carried away and a considerable quantity of the deck gear smashed. The Karthago left Hamburg on Nov. 18 for New York, her course being altered for St. Johns on her third week at sea.

Captain Gaul and his crew of eight men of the schooner Horace W. Macomber arrived at New York from Nassau on the steamer Vigilancia last week. The Horace W. Macomber was wrecked on Mossell's Shoal while bound from Rockport, Mass., for Key West. She was built at Newburyport, Mass., in 1890, and was owned by a Boston concern.

Captain Ames P. Tefft, of Point Judith life saving station, recently reported the number of vessels having entered the national harbor of refuge, Point Judith, for shelter during the month of November as follows: Schooners, 48; sloops, four, steamers, five; barges, 62; tugs, 42; and catboats, six. The total was 167.

The German freighter Harburg, which grounded on the outer shore of Long Island near the Bellport life saving station, during the dense fog of last Saturday, has been floated. About one-third of the cargo was jettisoned by the wreckers before several tugs succeeded in getting the vessel into deep water. She arrived at New York leaking slightly, the full extent of the damage being unknown.

Tugs and steamers towing barges in the North and East rivers of New York are required after Feb. 1 to bunch their barges above a line drawn between the Statue of Liberty and the entrance to Erie basin. When tows are entering Long Island sound from the westward, the lines may be lengthened out to the prescribed limit after passing Fort Schuyler, and when bound for New York from Long Island sound, tows must be bunched before passing Whitestone Point.

A cargo of Canadian wheat, which arrived by rail at Philadelphia, from Manitoba, was shipped from that port last week on the British steamship Afghanistan. The cargo consisted of 234,177 bu., valued at $257,694.

By the explosion of a lamp in the engine room, the tug Leader, of Philadelphia, was badly damaged by fire recently. The blazing tug was beached at Oldman's creek. All of the house and part of the wooden hull were burned.

SHIP YARD NOTES.

The New York Ship Building Co., Camden, N. J., launched the first of eight steel barges which it is building for the Lehigh Valley railroad, on Dec. 5.

Crawford & Reid, Tacoma, Wash., will launch in about a month a 107-ft. freight and passenger steamer for Capt. John McDowell. She is 19 ft. beam and 5 ft. deep.

The Union Iron Works of San Francisco, Cal., has completed the extensive repairs to the German steamer Anubis, which was wrecked on the California coast some months ago.

I. L. Snow & Co., Rockland, Me., have the three-masted schooner Tarrantine, which is in course of construction at their yard, ceiled up to the clamp streaks.

The New England Co., Bath, Me., expects to launch the four-masted schooner building for Capt. James Hawley, of Bath, before the end of the present month.

The Fore River Ship Building Co., Quincy, Mass., has been awarded contract for effecting repairs to light vessel No. 74. The bid upon which the award was made was $3,282.50.

The Newport News Ship Building & Dry Dock Co., Newport News, Va., is to build a tug for the Lambert's Point Towboat Co. The new vessel is to be 100 ft. in length and will be equipped with powerful machinery.

William E. Woodall & Co., Baltimore, Md., are to overhaul the four-masted schooner Charles K. Schull, which was recently sold at marshal's sale after having been salved by the steamer Ocmulgee.

The Maryland Steel Co., Sparrows' Point, Md., recently launched a dipper dredge built for Michael Dady, of New York. The dredge is to be towed to Cuba, where Mr. Dady has a contract. She is 110 ft. long, 40 ft. beam and 10 ft. depth.

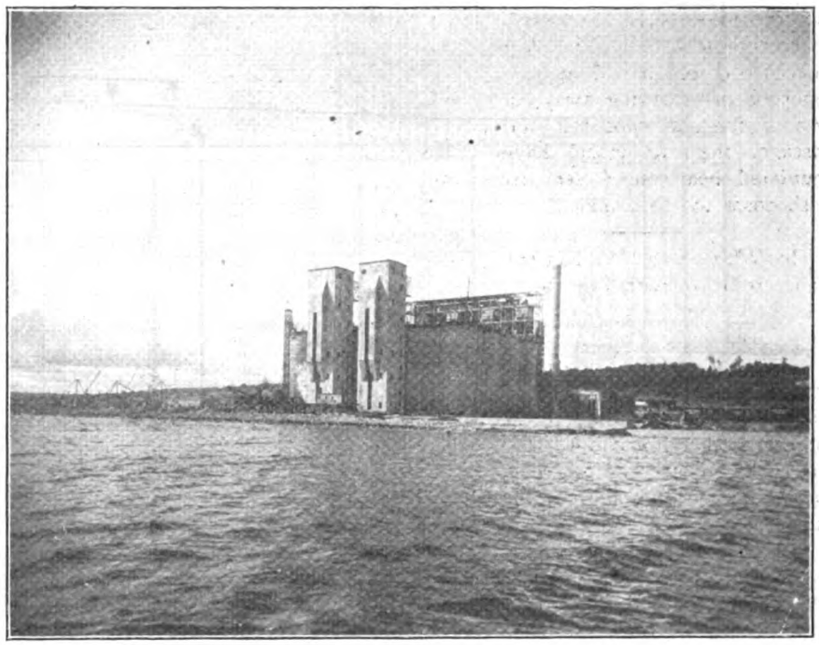
Edward Heath, Tacoma, Wash., is to build a tug for the Snowdon-Owsley Logging Co., of Seattle, work having already been begun upon the craft. The vessel is to be 50 ft. long, 12 ft. beam and 5.6 ft. depth of hold and will be powered with a 50-H. P. engine.

The Kelley-Spear Co., Bath, Me., has begun construction on the tugboat which they are to build for the Commercial Towboat Co., of Boston, Mass. She is to be 138 ft. long on the keel, 26.6 ft. beam and 15 ft. deep. The engines and boilers are to be built by the Bath Iron Works, Bath, Me.

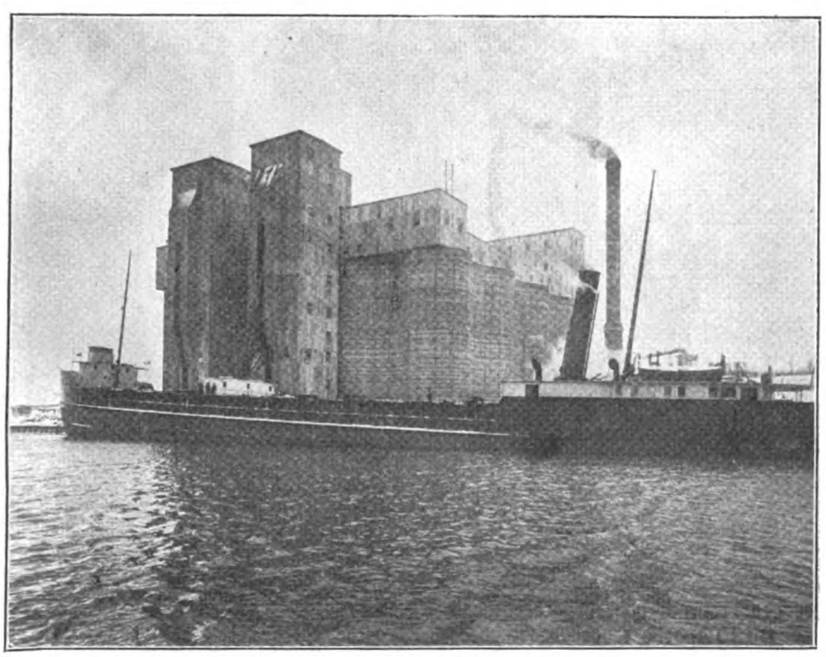
New Grand Trunk Pacific Elevator at Tiffin, Ont.

The latest addition to the list of large terminal elevators of Eastern Canada, and by far the largest and most rapid of the elevators at Georgian Bay ports, is the plant which has just been finished for the Grand Trunk Pacific Terminal Elevator Co., at the new harbor of Tiffin, near Midland, Ont. This elevator has a capacity of 2,000,000 bushels, and is fireproof throughout, being built of reinforced concrete to the tops of the bins, and structural steel above that point.

Its two marine towers are of the traveling type, familiar to those who are acquainted with Buffalo elevators. The use of traveling towers was decided on after a careful canvass of the conditions and the securing of expert opinions from a large number of leading operators of marine elevators. The important arguments placed before the designers by the practical men who were operating plants for unloading vessels, were that while stationary towers, placed at multiples of 12 ft. apart, would be able to unload the greater proportion of the modern freight vessels, yet there would be some in which but one tower could be used at a time if of stationary type, while two traveling towers could be used simultaneously in any vessel, no matter what the hatch spacing; moreover, with movable towers there would be no delay because of one leg being idle while another was finishing up its work in some other hatch, but since the tower and not the vessel was to be shifted, the towers would operate independently of each other, and the minimum amount of time would be lost.



VIEW OF GRAND TRUNK PACIFIC FLEVATOR TAKEN ON AUG. 19, 1908, SHOWING STORAGE BINS COMPLETED, CORRUGATED COVERING COMPLETED ON MARINE TOWERS AND ALMOST COMPLETED ON WEST SIDE OF CUPOLA OF WORKING HOUSE.
Built by John S. Metcalf Co., Engineers, Chicago.

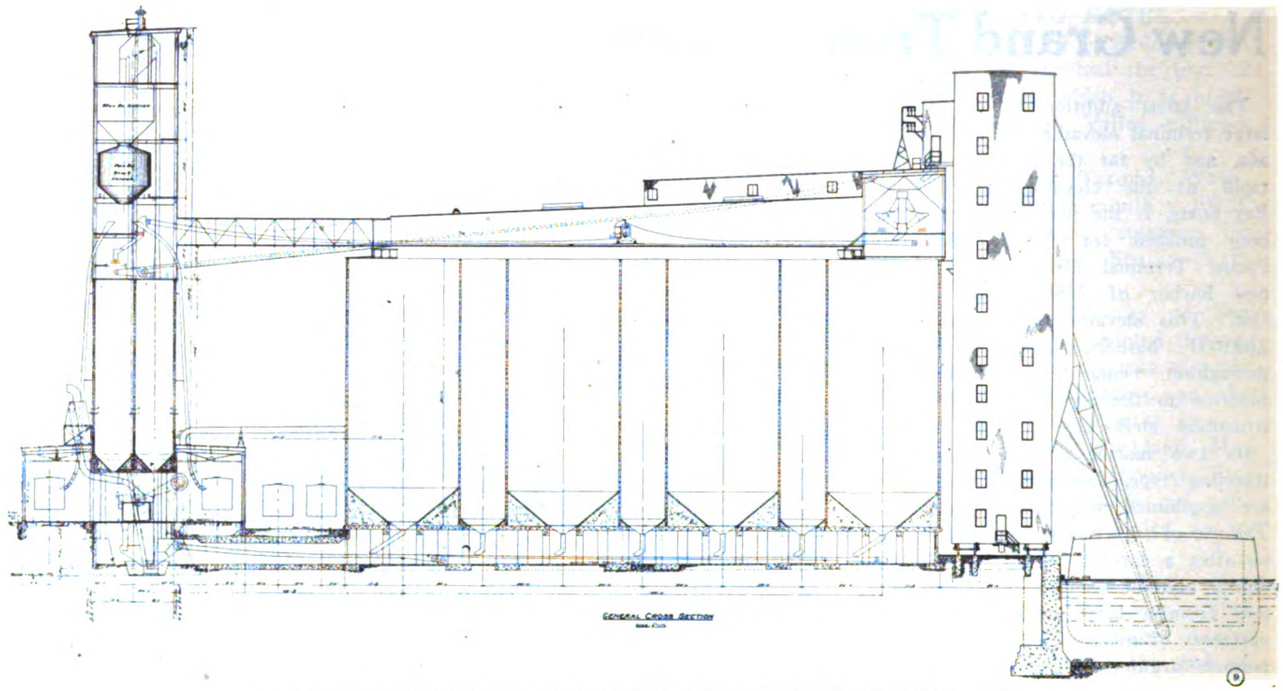


UNLOADING STEAMER W. D. MATHEWS AT GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, NOV. 17, 1908. ONE MARINE LEG IN OPERATION.
Built by John S. Metcalf Co., Engineers, Chicago.

Each marine leg is 96 ft. long from center of head pulley to center of boot pulley, and has an elevating capacity of 20,000 bu. per hour on the dip. It discharges to a 400-bu-scale hopper which, after the grain is weighed, discharges to a lofter leg, elevating the grain to spouting and belt conveyors, which in turn distribute it to the storage bins. A unique system of spouting enables the grain to be diverted from one bin or belt to another without stopping the leg. The marine towers are built of structural steel, and have concrete floors and roofs.

The storage bins are 63 in number, 32 of them being cylindrical in shape, 33 ft. inside diameter, and the balance being interspace bins. The bin walls are built of reinforced concrete. The total capacity of the storage house is 2,000,000 bu., and it is so arranged that future extensions can be made, to result in a maximum total capacity of 10,000,000 bu. The extension also contemplates the addition of a third marine tower.

The shipping elevator is a structure with rectangular reinforced concrete bins and steel cupola. It has small storage capacity (150,000 bu.), as it is intended principally for the loading of railway cars. For this purpose four shipping legs, four 2,000-



GENERAL CROSS SECTION GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, ONT.
Built by John S. Metcalf Co., Engineers, Chicago.

bu. scale hoppers on 120,000 pound scales, and eight car-loading spouts are provided. This shipping house will be able to load from 250 to 300 cars in a working day of 10 hours.

All parts of the elevator are driven by electric motors, current for which is supplied by two Westinghouse-Parsons turbo-generators, one of 500 K. W. and the other of 300-K. W. capacity.

Steam is furnished by four 250-H. P. Manning vertical tubular boilers operating at 160 pounds pressure. The smoke stack is of reinforced concrete.

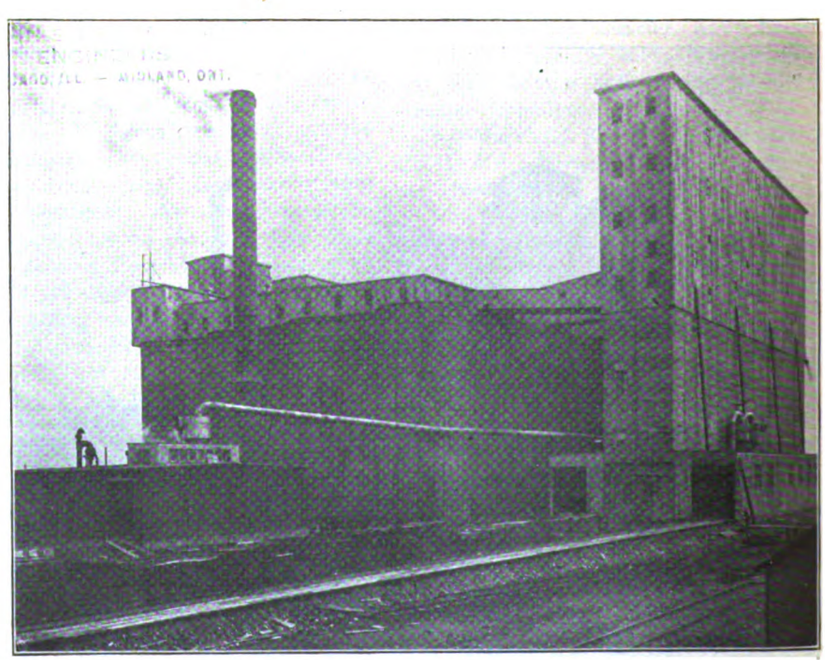
A complete system of electric lights, telephones and electric signal bells is installed in all of the buildings.

The first steamer to unload at the new elevator was the Canadian steamer "Collingwood," which discharged 220,000 bushels early in November. Only one of the marine legs was in operation at that time, but it is anticipated that both legs will be ready for operation before navigation is closed this year.

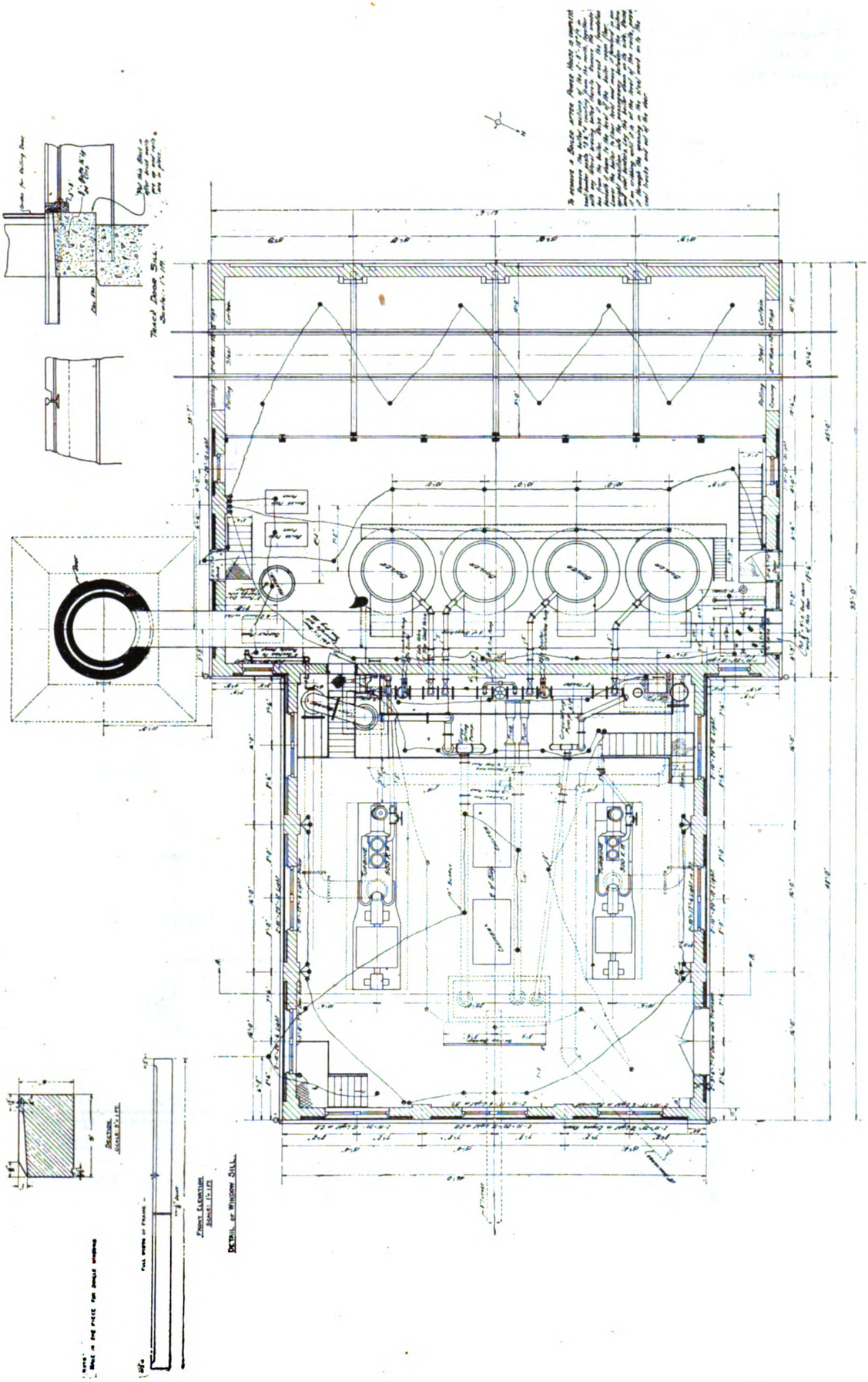
No expense has been spared in making the elevator absolutely fireproof, including the use of wire glass windows, electric wiring in conduit and even a hydrant system for extinguishing possible fires outside of the elevator, in the way of burning freight cars or burning vessels in the slip.

Seven hundred and thirty ft. of concrete wharf, carried down to sufficient depth to provide for 25 ft. of water at some future time, was constructed along the front of the elevator, and of the site of future extensions. A splendid channel with 21 ft. of water has been dredged by the Dominion Government from the deeper portion of Midland harbor to the new elevator. The plant is able to efficiently handle lake vessels of the largest sizes that have been built or that will be constructed under any future conditions which can now be foreseen.

An idea of the magnitude of the work may be gained from the knowledge that about 40,000 barrels of cement were used in the construction, and that the builders installed at a gravel pit, 60 miles away, a complete



VIEW OF GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, TAKEN FROM RAILROAD SIDE, NOV. 23, 1908.
Built by John S. Metcalf Co., Engineers, Chicago.



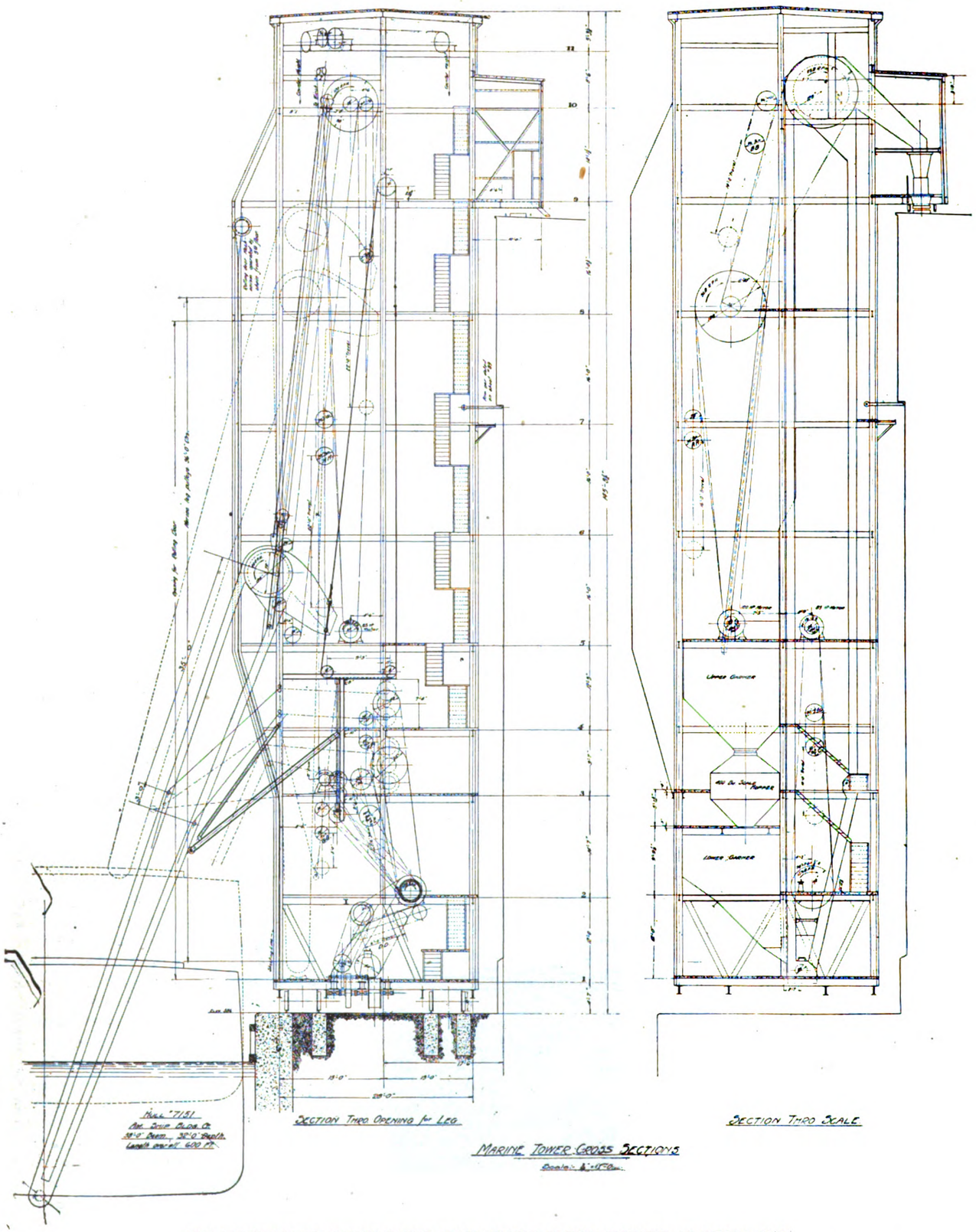
PLAN OF POWER HOUSE GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, ONT.

Built by John S. Metcalf Co., Engineers, Chicago.

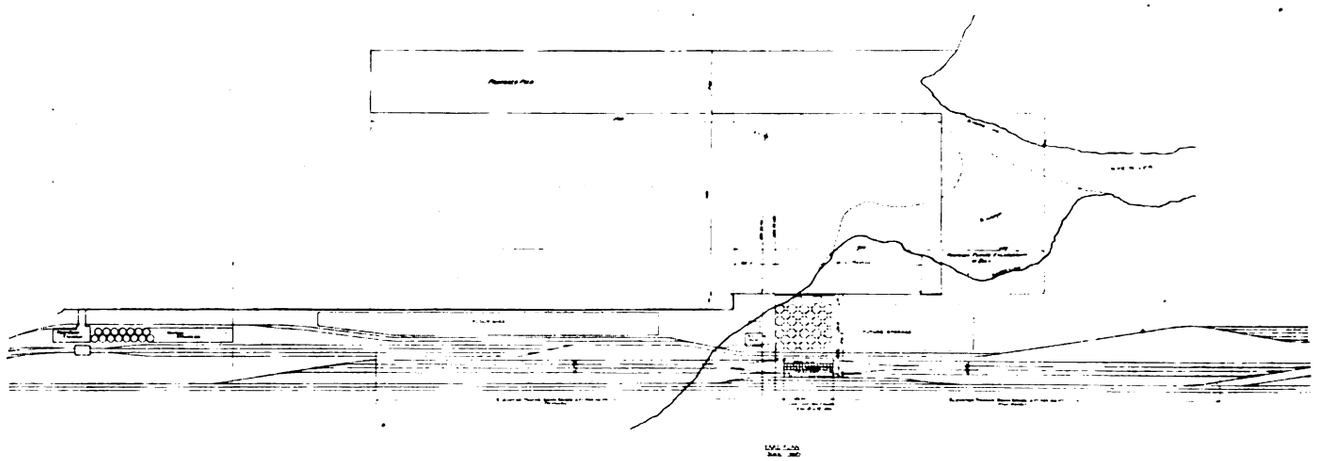
crushing, screening and washing plant for the supply of material for concrete. Almost two miles of rubber belt were used in the conveyors and the elevator legs.

The elevator company is a subsidiary company of the Grand Trunk Pacific Railway, and the house will be operated along the lines of the Grand Trunk policy in the operation of their elevators at Depot Harbor, Ont., Montreal, Que., and Portland, Me.

Frank W. Morse, vice president and general manager of the Grand Trunk Pacific Ry., placed the contract for



CROSS SECTIONS OF MARINE TOWER GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, ONT.
Built by John S. Metcalf Co., Engineers, Chicago.



YARD PLAN GRAND TRUNK PACIFIC ELEVATOR AT TIFFIN, ONT.
Built by John S. Metcalf Co., Engineers, Chicago.

the design and contruction of the entire plant with John S. Metcalf Co., gain elevator engineers of Chicago, Ill., and Midland, Ont. The expenditure has been in the neighborhood of $1,000,000.00. An enviable operating record is expected of the elevator next year, and vessel-men may be assured that cargoes will be handled rapidly and efficiently.

AROUND THE GREAT LAKES.

The steamer J. J. Albright of the Mitchell fleet will undergo repairs at Superior.

The Cleveland life-saving station closed for the season at midnight, Tuesday, Dec. 15.

The annual meeting of the Lake Carriers' Association will be held in Detroit on Thursday, Jan. 14.

The lightship Kewaunee, stationed at southeast shoal, Lake Erie, will be brought to Cleveland for necessary repairs.

The fifth annual convention of the Pittsburg Steamship Co.'s masters and officers will be held at the Hollenden, Cleveland, on Jan. 6.

The steamer Mohawk, which was ashore near Detour, will be surveyed at Ecorse. She lost her rudder and wheel when she went on the rocks.

Operations were suspended at the Hanna docks at Sandusky on Tuesday, when the steamer Nyanza cleared for Buffalo with coal.

The annual ball of the Marine Engineers' Beneficial Association of Cleveland, will be held at the Chamber of Commerce hall on Jan. 29.

The steamer Northern Queen, which sunk the steamer North Star, will be repaired at the Superior yard of the American Ship Building Co.

The South Buffalo Canal & Dock Co. has been incorporated by William A. Rogers, Stephen M. Clement, Charles W. Goodyear, Hugh Kennedy and William T. Shepard, all of whom are identified with the Buffalo & Susquehanna Iron Co. The purpose of the organization is to purchase land adjoining the plant of the Buffalo & Susquehanna Iron Co. for the erection of additional ore docks.

The tug Yale of the Great Lakes Towing Co.'s fleet, turned turtle at the entrance to Buffalo river on Sunday, trying to pull the steamer Yale clear of the steamer A. E. Nettleton.

The steamer William M. Mills delivered 12,000 tons of hard coal at Sheboygan on the last trip of the season. This is the largest cargo of coal ever delivered at the port.

The Cleveland lodge, Shipmasters' Association, will hold its first regular meeting at its quarters on Superior street on Friday afternoon, Dec. 18.

The new passenger steamer building at the Ecorse yard of the Great Lake Engineering Works for the Cedar Point Resort Co., will be named G. A. Boeckling.

The property of the Northwestern Co-operative Coal & Dock Co. was sold under foreclosure proceedings to the Northern Dock Co., of Duluth, last week, for 100,707, the amount of the dredging claims.

Andrew Furnseth, of San Francisco, was elected president of the Seamen's Union of North America at the annual meeting at New Orleans. Edward Stack, of Buffalo, was elected third vice president.

The steamer Lagonda of the Mitchell fleet, one of the fastest freighters on the lakes, will be reduced in power at the South Chicago yards of the American Ship Building Co. One of her boilers will be taken out.

Announcement is made that a government life-saving station will be established at Eagle harbor in Keweenaw county, and will go into commission next season. The locality is a dangerous one for mariners.

The small schooner Belle, in tow of the steamer F. W. Fletcher, bound from Manistee to Chicago, parted her tow line, off Big Point Sauble, and went on the beach. The crew of the Belle were rescued with great difficulty in the heavy sea by the Fletcher's crew who sent out a small boat.

Property has just been transferred from President Louis Hill, of the Great Northern railway, to the Duluth, Superior & Western Terminal Co., giving the latter company the site necessary for the construction of more ore docks alongside the Great Northern's present dock at Allouez Bay. This company operates the Great Northern docks.

The steamer James E. Davidson of the Tomlinson fleet, went ashore at Kettle Point on the Canadian shore about 15 miles east of Ft. Gratiot light, in a blinding snow storm on the night of Dec. 12. Much sympathy is expressed for Capt. Hugh Stevenson, who was making his last trip of the season and who in all his 20 years' experience has never had an accident of any consequence. Kettle Point is as mean a place to be stranded on as can be imagined, as it is a rocky formation, the ledge extending several miles into the lake with varying depths, with absolutely no shelter whatever from storms. The tugs Favorite and Harding and the lighter Wayne were rushed to the scene and succeeded in releasing her after lightering 50,000 bu. of oats. Her forward compartment is full of water and tanks Nos. 2 and 3 are punctured. The Davidson was bound for Buffalo with a cargo of clipped oats.

Naval Architects and Marine Engineers.

The fifth paper read at the November meeting of the Society of Naval Architects and Marine Engineers was upon the subject, "Further Propeller Analysis" by Clinton H. Crane, as follows:

It is with considerable diffidence that I present this brief paper on propellers, as it is a subject which has been attacked with so much acumen by our leading mathematicians, but in trying to make use of the very valuable data on the subject contained in the Transactions of our Society I have found the method outlined here of sufficient value to make me hope that it may be of some assistance to others. As every one else, I assume that the law of comparison holds good for propellers.

The lettering of the formula will be as follows:

Let T = a thrust of any propeller; p = the pitch ratio; D = the diameter; R = the revolutions per minute; s = the slip ratio; H = the brake horsepower required to turn propeller of diameter D with pitch ratio p and slip s; and T_1, D_1, R_1, H_1, represent the thrust diameter, etc., for a similar propeller working at the same slip.

S = the power factor in "Taylor's" formula.

Then $\frac{T}{T} = \frac{D^4R^2}{D_1^4R_1^2}$; and $\frac{H}{H} = \frac{D^5R^3}{D_1R_1^3}$

Let D_1=unity and R_1=100;

Then $T = \frac{D^4R^2}{10{,}000}T_1$;

And $H = \frac{D^5R^3}{1{,}000{,}000}H_1$.

In the formula (1) variable T_1 has been obtained by Professor Durand for a series of propellers, results of which are published in the Transactions of the Society, Vol. 13, and also a variable which we will call w_1, or work in foot-pounds per revolution at 100 revolutions per minute for a propeller 1 ft. in diameter.

H_1 will $= \frac{100\ w_1}{33{,}000}$,

and H will $= \frac{D^5R^3w_1}{330{,}000{,}000}$

$=00\ 000\ 000\ 303\ D^5R^3w_1$.

Naval Constructor Taylor, in the Transactions of the Society, Vol. 12, gives $H=.0093648\ D^2\ V^3\ S$.

Now $V = \left(\frac{pDR(1-s)}{101\ 1/3}\right)^3$;

$H=00\ 000\ 000\ 9\ D^5R^3p^3\ (1-s^3S$;

$w=2.97p^3(1-s)^3S$.

This gives an easy method of converting w_1 into S or S into w_1. As w_1 gives us a variable which is practically of the first degree and S variable of the third degree in terms of slip, I prefer to use w_1.

w_1 increases with the pitch ratio with the thickness of the blade, area of the blade, and with the slip with all propellers except those of very small pitch ratio.

From a careful study of values of w for propellers of the same blade contour and blade thickness and the same slip within reasonable changes of pitch ratio — will $= \left(\frac{p}{p_1}\right)^{\frac{3}{2}}$,

instead of $\frac{w}{w_1} = \left(\frac{1+(1-s)^2p^2}{1+(1-s)^2p_1^2}\right)^{\frac{3}{2}}$

as one would suppose.

I am showing two curves plotted on logarithmic paper at 20 per cent slip taken from the Durand series of No. 5 propeller and Taylor series No. 4-9-14-19-24 and 29. For higher slips w increases at a slightly higher power than $\frac{3}{2}$ and at a lower slip at a slightly less power.

It will be noticed that the horsepower formula deals with the fifth power of the diameter, the third power of the revolutions and the first power of w, consequently in determining diameter from this formula a small error in w produces a very much smaller error in diameter; that is an error of 10 per cent in w would only give us an error of 2 per cent in diameter.

For questions of efficiency we must all rely very largely on experimental results. What we all have to do in designing is to fit a wheel to an engine of certain power turning at certain revolutions, and I have found this formula of great assistance in doing so. It makes it possible to use more quickly the amount of data each possesses.

DISCUSSION.

Prof. C. H. Peabody: I have been waiting for some of those who have more to do with propeller experiments to speak on this matter. I think we ought to emphasize the importance of an attempt of this nature, to take experimental work, which is necessarily difficult of interpretation, and present it in such form that it can be conveniently used. The diagram shows a close concordance between tests made by Prof. Durand and tests made by Mr. Taylor. It is, of course, in a way the most difficult matter to obtain good experimental data. The concording, arranging and using this data is frequently as difficult, and is quite as important.

The President: Is there any further discussion on this paper?

D. W. Taylor: I am very glad to see that Mr. Crane has taken the data which has been published in the transaction and has written a paper which has a very direct bearing upon this practical application. I think it was pointed out at the time of the publication of the data given by Prof. Durand and myself, that the object was to give experimental data so that any person interested could convert it, or follow the methods he considered more desirable. I know of friends abroad who have taken the matter and developed it in the same way as Mr. Froude.

As I understand it, the main point in Mr. Crane's paper is contained in the formula at the top of page 2, where he gives an expression for the direct horse power absorbed by the propeller, H. That is a very simple and direct expression, showing the power which a propeller should absorb, with the revolutions and the diameter, and this factor w_1, takes account of the slip. If you assume 20 per cent slip, for instance, and take from his diagram the values of w_1—I understand the vertical lines refer to w_1, and the horizontal lines to pitch ratio, you have a simple expression, which on the assumption of 20 per cent slip, gives you the diameter in range of revolutions, which, assuming the law of comparison to apply to model experiments, may absorb the power you start with at H. You generally know the power you intend to use, and the diameter, and the revolution together are connected simply by this formula and they are the main factors. Throughout the range of propeller work, where the law of comparison is thus applied, this is an exceedingly simple method of getting at the result. The diameter gives the fifth power, and you can get a wide variation of w_1 far beyond the variation shown in the figures, with an almost

inappreciable change. As the diameter enters into the fifth power, and the diameter refers to w_1, you will be driven at once to a diameter associated with 20 per cent slip. It is interesting to trace out. Table 1 varies with the pitch ratio of the three halves. In practical application that would be unnecessary, as you have the figure of values of the w_1.

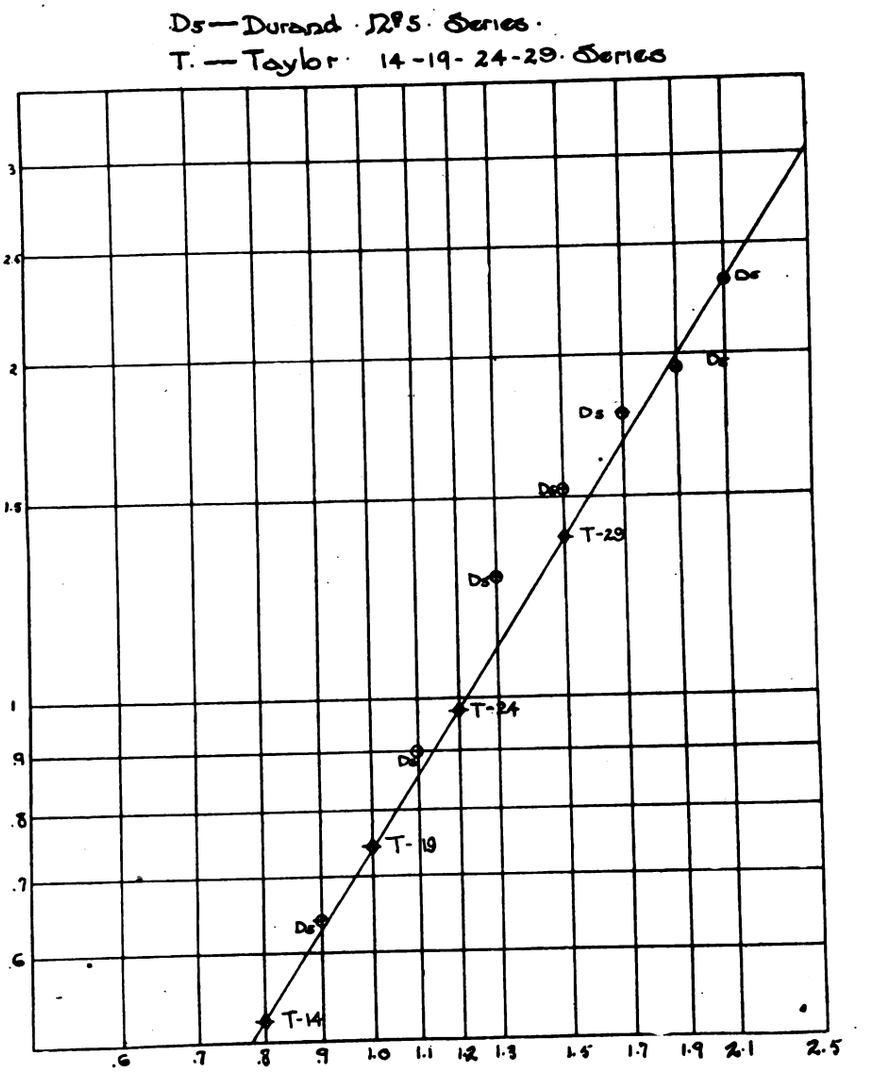
The President: Are there any further remarks? If not we will ask Mr. Crane to close the discussion.

Clinton H. Crane: I should like to emphasize one other matter, and that is that this particular diagram only applies to one particular series, that it is to a propeller of a certain thickness. The advantage which I found in the use of the exponent has been that knowing one spot on our curve, knowing the horse power required by a propeller of a given shape of blade and given thickness, it gives a method of predicting with resonable certainty the value of w_1 for a propeller of different pitch ratio, which we may actually have no test or spot of. It is really simply an expression of a method which anybody can quickly apply to different data they possess of power required to train a propeller of given proportions.

Of course, in this question of a large sized propeller we are in trouble with our slip, but I have found in actual use if we use apparent slip, and leave out the effect of our thrust augmentation to the wetted factor, that we do not come to a very bad result, simply bearing in mind for our efficient spots that we have got to consider what the real slip is.

Lieut. Com'dr. L. H. Chandler presented a valuable paper, one of the most valuable in fact ever read before the society. It was on the "Deviation of the Compass Aboard Steel Ships—its Avoidance and Correction" and was most competently handled. Its extreme length, intricate drawings and elaborate statistical tables make it impossible of reproduction in a publication of such limited space as the MARINE REVIEW. Its object is well stated in the opening paragraph as follows:

I believe that the members of our society have never given much attention to the question of the magnetic effect of the structure of a steel ship upon the compass, and, having recently been in a position to obtain certain valuable data on this subject, from observations taken aboard our battleships and torpedo-boat destroyers, I venture to present this paper to the society, in



the hope of arousing an interest which will lead our ship designers and builders to realize the necessity for a clear comprehension of the general principles involved and the need for careful planning in arranging the details of construction of vessels in the vicinity of compass positions. It has been my experience as a navigator that a little lack of understanding or care in regard to this point on the part of the designer and builder often places the navigator from the start under a handicap so severe in its nature as to often constitute a real and unnecessary menace to the safety of the ship.

Joseph H. Linnard: I think after reading this interesting paper the shipbuilders know why the navigators have a rod in pickle for us.

Mr. Chandler: I think you pickled it up before you put it in.

Mr. Linnard: I have had a good deal of experience in that line myself, because of work in locating the compasses on a man-of-war is a more difficult problem than on the average merchant ship, for two reasons: One of which is that the merchant ship has usually to sail a definite route, comparatively, except the small tramp steamers, and the change of latitude is not very great on most routes and the difficulties which arise from the change of induced magnetism in varying latitudes do not have such severe effects, as in the case of men-of-war, which go in all latitudes, both north and south, but the more important reason is that the modern man-of-war is composed of a mass of rotating turrets and a number of masts which are used for signal purposes, and various other reasons, and a number of funnels, because they are usually of high power, and altogether the naval architect is completely at a loss to find out where to locate the compass outfit where it will not be affected by rotating masses of iron or vertical iron.

The result has been that some of the shipbuilders and the bureau of

equipment insist on more brass in the vicinity of the standard and compasses, and I think some of us are beginning to think that they will soon demand that the whole ship be built of brass.

The necessities of the service have required us to study the location of compasses in the interior of the ship, and as any of us who have studied the matter of putting the compass in the interior of an iron box knows, it is deprived of almost all directive force, and to give it some force we have been required, in the ships where the compasses are located in the interior of the vessel, to build bulkheads or box of brass, the object of which will not be so perceptible to those who have not had to do with the matters dealt with in Mr. Chandler's paper.

Sometimes we do not know the reasons for these various things, and one occurred to me recently, which, though in times gone by I was familiar with the the compensation of the compass, I have never gotten quite right on it. I have had to do with ships recently where the builders proposed to put in 10-in. liquid compass cards, and the builders said they preferred 7.5 inch compass cards, which had been their regular standard practice for years, and it is not clear why they prefer a smaller compass than a larger one. Perhaps Capt. Chandler will explain that point.

Mr. Chandler: The smaller the needle, the more accurately it tends to place itself along the direction of the lines of force; that is, an infinitely small needle would take up the true direction of the line of force more accurately than a longer one. The bigger you get the compass card, the larger the card marks on it are, and the easier you can read them and the easier it is to steer by them. The only question involved is a happy medium—the bigger the card, the more weight, the greater the difficulty to free it from shock and jar, due to vibration, rolling, etc. After many years of experience they hit on the 7.5 in. compass as being a satisfactory length of needle to get a clear card and at the same time accurate magnetic qualities. I presume this ship was changed so as to be fitted with the standard naval outfit, rather than to introduce a new form without any particular advantage to be gained.

The Vice President: Will Prof. Peabody discuss the paper.

Prof. C. H. Peabody: I do not know that I have anything especially to say in connection with this paper, but it was brought to my attention that shipbuilders should have some knowledge in regard to the placing of the compass, and they should know something of the features which are adverse, and those which would give reasonably good compensation.

I think this paper is particularly valuable to us, because it presents to us the navigator's point of view, and his difficulties in such a way that we realize them. I was struck with one or two things, one was that the author of the paper is continually speaking of a good compass and a bad compass. They are all standard compasses, and they are all good. I am inclined to think of a certain expression, that a certain child is a good baby or a bad baby, depending on whether it gives trouble or not.

Mr. Chandler: The same thing is true of a compass, whether it is considered a good compass or a bad compass, depends on its surroundings more than anything else.

Mr. Peabody: The author also speaks of the fact that while this paper gives a notable example of the way in which a theoretical problem can be solved practically, but I beg to point out, that whereas you have a theoretical solution of it, it does not go that way. Having had my attention drawn to this it appeared to me, after having looked over such work as I could hurriedly get at, that the derivations of the equations for deviation are not altogether satisfactory, I think they do not take account of all the members of a ship which may act upon the compass. They do take account of those members which are the principal members, and on the whole, the members of the ship lie fore and aft or athwart ship, all vertical. Of course, there are exceptions to this, as the author has explained to us.

Now, then, if that is the case we must not be surprised if occasionally the applications do not check very exactly with the results obtained by experience. The gist of the method is that it does give us a practical working method by which navigators by some prescience, which seems like developing another sense, know where the north is when the compass never points toward the north under any circumstances. With that as a basis, there are some things which I am constrained to look at, because I think they are the ones in which we are most interested—in a certain sense the shipbuilders here have their designs given to them by the naval architects, perhaps from the Naval Department, where the designers presumably have been seamen, and they are not giving the same attention to it now that they did at one time, and they must put material in the place where the design calls for. In the merchant ships the conditions are different. There the builders may have more control.

In passing, not wishing to emphasize it at all, I would like to ask the author if on page 8, in the paragraph towards the middle of the page, where he gives a statement of the diagram from which the discussion is produced, if he will not try to make it a trifle more precise. I found on reading it that, while I thought I had some knowledge of what was necessary in the place, that I had to read it twice to understand what was presented. Excuse me if I call attention to what is, of course, merely a minor defect.

I want to emphasize what the author has produced as indicated on page 13, in the discussion of the five constants. He has there assured us that in those five a good compass will have A', very small, and B', very small. This A' depends upon unsymmetrical horizontal members, and E' also depends upon unsymmetrical horizontal members. These members are rather unusual, and perhaps the ship builder, even after the design has been given to him and his attention is called to it, may avoid placing such members near the compass, and that would considerably facilitate the work. The thing which interested me was this—here we have five constants, of which two are likely to be small, or zero, leaving three. These observations even should be enough to determine the three constants. If that is to be done, however, it is altogether desirable that the observations to be selected should not be three taken from three points, but three taken from observations taken during swinging ship. This calls to mind a thing which seemed odd to me, when I first saw it, namely, that Napier's diagram is convenient for passing from compass bearing to magnetic bearing or conversely, but it is not convenient for ordinary observations taken during swinging of the ship, for the reason that when the deviation is fairly large the curve is so long and of such a flowing character that one may draw a fair curve from all the observations, even if some are wrong. If one will draw a rectangular diagram, as is commonly done for work of this sort, and lay off the deviations as is usually done, then, of course, the diagram may be made to any scale desired, and then, though the deviations are small, they can be so sketched that one can recognize at once whether a certain observation is probably an error, or whether one may give too much weight to it, and picking out such a

curve in three points it is possible to solve the three constants, or if one needs to, the whole five. There is some advantage in numerical computation in taking eight points.

Mr. Chandler: We use 8 and 16 a good deal. We would rather use 32, but we generally take 16.

Mr. Peabody, if you have 16 points and select 8 of them, your computation is easier, but I would not dare to instruct the navigator familiar with this work.

Mr. Chandler: For large work, surely.

Mr. Peabody: The author has shown us that the compensation for a new ship alongside the dock can be made from a single heading of the ship. I think that is not always known. Presumably the compass adjuster, or some person familiar with the work of the compass, or the navigator, is required to attend to this matter. Occasionally in small yards the naval architect may be a handy man, and there is no reason why he should not add this to his other accomplishments.

Mr. Chandler: You cannot deflect any greater than a fifth of a degree on that point.

Mr. Peabody: Any compensation for a compass, if it is not wrong, is better than no compensation, especially when errors are large.

I want, however, to speak of those things which the ship builder should have some control over. The author has spoken of the difficulty that comes through some permanent magnetism which varies from time to time. Now, the sub-permanent magnetism is very largely the result of the way in which the ship is built. I may be open to correction, but I believe if the slabs on which the ship is built happen to lie in magnetic meridian the result is unfortunate. The ship builder cannot select the position of these slabs, but one thing can be done, I believe, always, and that is the ship may be reversed in heading for launching, and then the sub-permanent magnetism would be less troublesome at the beginning.

The author has also pointed out most clearly the importance of small masses of iron near the compass. This should be emphasized as being one of the points in which we are interested, and in the discussion members also, and in some cases, if necessary, we should make special construction to avoid such things. I have seen statements of very unfortunate conditions where the ship builder was not aware of this matter, and in which the adverse influence was not detected until after it was too late.

William J. Baxter: The author, with his well known modesty, has not brought out in the way in which I think it should be on the record, the great amount of study, and the great amount of opportunity for study, which he has enjoyed in connection with the present paper, which in its type will be an historical one. Mr. Chandler was the navigator of the battleship Connecticut, the flagship of our fleet, which is now going around the world, and his work extends from Norfolk down to the Straits of Magellan and up to San Francisco. He speaks of some of these matters, of the work which he has done, in a very slighting way, but those of us who know a little bit about compasses—of course we do not pretend to know as much as he does—but we know enough to appreciate the remarkable piece of work which has been put up, and I simply state it, not to add to the value of the paper, because that needs no commendation, but to explain to others who read it and particularly our friends in Europe, what this paper is based on, and the unique circumstances attending it, and that it is opening a wide field which was, not many years ago, unthought of.

Mr. Chandler: I am sorry, Mr. Baxter, that I have got to shatter a part of your complimentary words, but I gave up the navigation of the Connecticut just before we started around the Horn. Lieut. Day relieved me. I was navigator of the ship for a year, but was relieved just after starting off the west coast.

Mr. Baxter: Am I not correct in saying that you had all the data taken on that trip available?

Mr. Chandler: Yes.

Mr. Baxter: You simply make what I said still stronger.

Mr. Chandler: Mr. Day is proud of his achievement, especially the passage of the Straits of Magellan.

Mr. Baxter: I am very glad to welcome Mr. Day into the fold.

E. A. Stevens: Some years ago I remember being on board some English vessels, sailing out of the harbor, which were quite heavily rigged, and among the rigging was some iron yards. I was told by the navigating officials of the ship, it was found when they left here and met any kind of weather, they always spread sail if they could, this produced considerable heeling and that produced trouble with the compass, which they could not account for. I would ask Capt. Chandler about that. One other question—I understand in the service that the liquid compass is practically the only one used, is it not?

Mr. Chandler: Yes.

Mr. Stevens: In England, I believe, they use the Thomson-Kelvin compass.

Mr. Chandler: As a rule.

Mr. Stevens: I think they are abandoning it.

Mr. Chandler: They carry a liquid compass, but as an auxiliary, and have done that for a good many years. The objection to the dry compass is the difficulty when there is much motion on the ship. It is hard to keep it still. As to the effect of the iron charge, that is true, I fancy. Butler Duncan told me once that the compasses were not any good on the Defenders, because of the main boom. I asked him what they did when there was thick weather, and they were racing, and he said they did the best they could. Of course, you cannot compensate for something that is always changing.

George A. Carmack: That is because the boom was passing from one side to the other?

Mr. Chandler: Yes.

Mr. Carmack: Would it not bear the same relation as the yards?

Mr. Chandler: The same kind of effect.

Mr. Carmack: Something has been said about the liquid compass as being more difficult to study, or less accurate. Do you mean vibration?

Mr. Chandler: Rolling and pitching.

Mr. Carmack: I do not think a vessel will roll or pitch more than the liners, and I think they get very good results in the matter of compass.

Mr. Chandler: Undoubtedly they do—that is largely a matter of preference.

Mr. Stevens: Is not the liquid compass being introduced into the English service now?

Mr. Chandler: I think the liners carry one liquid compass, generally aft somewhere, but how much they rely on it, or what they use it for, I do not know.

Clinton H. Crane: I ask Capt. Chandler whether the dry compass cannot be made with lighter needles, and what is the theoretical reason for it?

Mr. Chandler: The making of a light needle is detrimental.

Mr. Crane: I thought you said the smaller the better.

Mr. Chandler: Yes, but not lighter. I was referring to the length. You must have a needle big enough to have good magnetic qualities. I said the bigger the better just now, and the smaller the better too. Magnetically, the smaller the better, but you must have a big enough mass of metal to have decent magnetic qualities, and to do that you must have more or less weight. In the dry compass that weight

is taken on a jewel pivot. In the liquid compass there is a jewel pivot on which the compass rests, but practically no weight. A heavier card brings less pressure on the pivot than is possible with the dry compass, with even the lighter card. The card as we have it has the slightest amount of negative buoyancy, just enough to keep it on the point.

Capt. W. Hovgaard: I ask Mr. Chandler if he has any further information about the non-magnetic steel to which reference is made in the paper? It is a point of considerable importance, if we could obtain steel which could be used in the neighborhood of the compass without detriment to the compass. I know that the Germans, if I am not mistaken, reckon there should be at least 25 per cent nickel in the steel in order to make it non-magnetic, and I have seen it used in a conning tower of a small cruiser with a 3-in. thickness of the walls in the conning tower, and they considered it was fairly satisfactory there.

That question of the use of compasses in the conning tower is also one which is very interesting, and I would like to hear if the commander has any experience or remarks to make on that point. I have seen compasses used in conning towers with some degree of success. That is, we could not navigate with them, in a sense, but we could use them to keep a certain course when once the ship was headed on a certain course. The directive force of this compass was very weak, but still the compass could be used. That was on a conning tower of 7 or 8 in. thickness in the walls.

As regards the Peichl compass, where a number of soft iron staffs are arranged horizontally in circle, we have used a similar arrangement some years ago in the Danish navy. We used it in a conning tower, and I compensated the compass for the deviation by means of that ring of soft iron bars, but it was found that the compass developed very strong octantal deviations. We did not discover it at once, but after having examined the deviations we found it on the cardinal points. We calculated it later, and we found there was a strong octantal deviation between the cardinal points. We removed the small bars, and then the compass was better. It may be that the arrangement proposed by Piechl is better, it strikes me it is somewhat, at least.

Mr. Chandler: I have no knowledge personally of the non-magnetic steel. Mr. Robinson is not here. Mr. Linnard might know something about that, or Mr. Taylor possibly.

D. W. Taylor: With reference to the question of non-magnetic steel mast, I do not believe that is commercially procurable in this country, but hope it will be at no very distant date.

Robert S. Riley: I think in connection with the troubles with the compass, it might be interesting to hear from Mr. Chandler his expression regarding the trouble. which is not mentioned, that some of these big ore vessels on Lake Superior, which are loaded with ore, have with their compasses. They start out from Duluth, and any troubles that they may have with their compasses has not only to do with the magnetic nature of the ore with which the vessel is loaded, but also the trouble due to the magnetism from great beds of ore on the shore. The idea has been suggested as to the possibility of using, instead of the compass, a gyroscope, something which is a novel proposition, and it may be interesting to the society.

Mr. Chandler: As far as the question of the cargo is concerned, of course that is something which requires individual treatment. The only thing a man with a cargo like that can do, when he leaves port, is to get his deviation and try to run on it. It would probably change, as any other mass would. He has thrown his compass out, as you would with the iron yards or boom, except that it will stay in the same place during the passage, probably. As to passing near ore beds, that is something we do not have much experience with on the ocean, of course. It is a thing which is in everybody's mind, and once in a while cases are reported, but as far as deep sea going is concerned, we are of the impression that that is a good deal like the matter of current used to be—in the case of the old navigators—an outside magnetic field is convenient to explain the result, a good deal like what you people call crystallization when something you make breaks up.

Elmer A. Sperry: Since the gyroscope has been mentioned and the use of anything outside of the compass seems to be so widely justified in view of Mr. Chandler's paper, would it be out of order to review what is being done at the present time with the gyroscope?

The Vice President: Not if you will make it very brief, Mr. Sperry.

Mr. Sperry: An Austrian engineer has been engaged for the last three or four years in perfecting a machine, and at last he has finished one that was exhibited this summer, that seems to run with extreme accuracy, and, of course, is entirely free from any of the corrections or objections pointed out in the paper. One wonderful aspect of the gyroscope is that even a very small compass—there are other forces at work that keep the absolute, true north, not the magnetic north, or any other direction that requires compensating for.

The final solution of the problem seems to be the employment of two small gyroscopes of different natural periodicity, one of which is mounted so as to perform the function known as precession. With this gyro-compass, an instrument much smaller than the one before us here, the true north can be maintained constantly, regardless of the changes about it, month in and mouth out, with less than 1/10 of a degree variation. It may be possible, that inasmuch as the liquid compass seems to be displacing the dry compass, that something else will come up that will displace the compass.

The Vice President: Is there any further discussion, gentlemen? If not, I will call on Mr. Chandler to close the discussion.

Mr. Chandler: I have nothing to say except in regard to the gyroscope. I most devoutly hope that it will be successfully evolved, but I am quite sure that the main responsibility for the safety of the ship will be for some time to come placed upon the compass.

TRADE NOTES.

The National Brake & Electric Co., Milwaukee, Wis., have just issued a catalog on air compressors for industrial service. Various types of compressors are described and illustrated with tables giving dimensions, capacities and other data. Catalog will be sent to any interested upon request.

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